DACW41-02-B-0005

US Army Corps of Engineers
Kansas City District
You Matter - We Care

Missouri River Basin

Wetlands Habitat Restoration Project Section 206

Nemaha Lake Kansas

Construction Solicitation and Specifications

FEB 2002

This is a Civil Works Program Procurement and is not Funded by the Department of Defense.

SOLICITATION, OFFER, AND AWARD *(Construction, Alteration, or Repair)*	1. SOLICITATION NO. DACW41-02-B-0005	2. TYPE OF SOLICITATION [X] SEALED BID (IFB) [ ] NEGOTIATED *(RFP)*	3. DATE ISSUED 27-Feb-2002	PAGE OF PAGES 1 OF 47

IMPORTANT - The "offer" section on the reverse must be fully completed by offeror.

4. CONTRACT NO.	5. REQUISITION/PURCHASE REQUEST NO. W58XUW-2025-0300	6. PROJECT NO.

7. ISSUED BY CODE W58XUW	8. ADDRESS OFFER TO *(If Other Than Item 7)* CODE
USAED, KANSAS CITY 760 FEDERAL BUILDING 601 E 12TH STREET KANSAS CITY MO 64106-2896 TEL: (816) 983-3845 FAX: (816) 426-5169	**See Item 7** TEL: FAX:

9. FOR INFORMATION CALL:	A. NAME GREGG C. GULLEDGE	B. TELEPHONE NO. *(Include area code)* *(NO COLLECT CALLS)* (816) 983-3808

SOLICITATION

NOTE: In sealed bid solicitations "offer" and "offeror" mean "bid" and "bidder".

10. THE GOVERNMENT REQUIRES PERFORMANCE OF THE WORK DESCRIBED IN THESE DOCUMENTS *(Title, identifying no., date):*

LAKE NEMAHA WETLANDS - Nemah County, Kansas (near Seneca, Kansas). Construction of approx 143.5 acres of wetlands and 8.6 acres of open water (at least 8 ft deep) habitat. One contract will be awarded to one contractor. The contract will be a firm-fixed price. Work under the firm-fixed price sections include, but are not limited to, excavation of the emergency spillway, inlet channel,and keyway and toe drain trenches; and excavation, haulage and placement of borrow materials for the compacted fill embankment. The contractor will provide all labor, supervision, equipment and materials necessary to construct the project covered by this contract. Construction services to be provided include site work, and equipment. Labor to be provided includes equipment operator, and all supporting trades.

11. The Contractor shall begin performance within 10 calendar days and complete it within 180 calendar days after receiving [ ] award, [ ] notice to proceed. This performance period is [X] mandatory, [ ] negotiable. *(See _____ .)*

12 A. THE CONTRACTOR MUST FURNISH ANY REQUIRED PERFORMANCE AND PAYMENT BONDS? *(If "YES," indicate within how many calendar days after award in Item 12B.)* [X] YES [ ] NO	12B. CALENDAR DAYS

13. ADDITIONAL SOLICITATION REQUIREMENTS:

A. Sealed offers in original and 3 copies to perform the work required are due at the place specified in Item 8 by 14:00:00 *(hour)* local time 3/27/02 *(date)*. If this is a sealed bid solicitation, offers must be publicly opened at that time. Sealed envelopes containing offers shall be marked to show the offeror's name and address, the solicitation number, and the date and time offers are due.

B. An offer guarantee [X] is, [ ] is not required.

C. All offers are subject to the (1) work requirements, and (2) other provisions and clauses incorporated in the solicitation in full text or by reference.

D. Offers providing less than 90 calendar days for Government acceptance after the date offers are due will not be considered and will be rejected.

SOLICITATION, OFFER, AND AWARD (Continued)

(Construction, Alteration, or Repair)

OFFER ***(Must be fully completed by offeror)***

14. NAME AND ADDRESS OF OFFEROR *(Include ZIP Code)*	15. TELEPHONE NO. *(Include area code)*
	16. REMITTANCE ADDRESS *(Include only if different than Item 14)* **See Item 14**
CODE / FACILITY CODE	

17. The offeror agrees to perform the work required at the prices specified below in strict accordance with the terms of this solicitation, if this offer is accepted by the Government in writing within _____ calendar days after the date offers are due. *(Insert any number equal to or greater than the minimum requirements stated in Item 13D. Failure to insert any number means the offeror accepts the minimum in Item 13D.)*

AMOUNTS	SEE SCHEDULE OF PRICES

18. The offeror agrees to furnish any required performance and payment bonds.

19. ACKNOWLEDGMENT OF AMENDMENTS

(The offeror acknowledges receipt of amendments to the solicitation -- give number and date of each)

AMENDMENT NO.										
DATE										

20A. NAME AND TITLE OF PERSON AUTHORIZED TO SIGN OFFER *(Type or print)*	20B. SIGNATURE	20C. OFFER DATE

AWARD ***(To be completed by Government)***

21. ITEMS ACCEPTED:

SEE SCHEDULE

22. AMOUNT	23. ACCOUNTING AND APPROPRIATION DATA

24. SUBMIT INVOICES TO ADDRESS SHOWN IN *(4 copies unless otherwise specified)*	**ITEM**	25. OTHER THAN FULL AND OPEN COMPETITION PURSUANT TO ☐ 10 U.S.C. 2304(c) ☐ 41 U.S.C. 253(c)
26. ADMINISTERED BY CODE		27. PAYMENT WILL BE MADE BY CODE

CONTRACTING OFFICER WILL COMPLETE ITEM 28 OR 29 AS APPLICABLE

☐ 28. NEGOTIATED AGREEMENT *(Contractor is required to sign this document and return _____ copies to issuing office.)* Contractor agrees to furnish and deliver all items or perform all work, requisitions identified on this form and any continuation sheets for the consideration stated in this contract. The rights and obligations of the parties to this contract shall be governed by (a) this contract award, (b) the solicitation, and (c) the clauses, representations, certifications, and specifications or incorporated by reference in or attached to this contract.

☐ 29. AWARD *(Contractor is not required to sign this document.)* Your offer on this solicitation, is hereby accepted as to the items listed. This award consummates the contract, which consists of (a) the Government solicitation and your offer, and (b) this contract award. No further contractual document is necessary.

30A. NAME AND TITLE OF CONTRACTOR OR PERSON AUTHORIZED TO SIGN *(Type or print)*		31A. NAME OF CONTRACTING OFFICER *(Type or print)*	
30B. SIGNATURE	30C. DATE	31B. UNITED STATES OF AMERICA BY	31C. AWARD DATE

SECTION 00010 Solicitation Contract Form

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0001					

LAKE NEMAHA WETLANDS
FFP - LAKE NEMAHA WETLANDS - Nemah County, Kansas (near Seneca, Kansas). Construction of approx 143.5 acres of wetlands and 8.6 acres of open water (at least 8 ft deep) habitat. One contract will be awarded to one contractor. The contract will be a firm-fixed price. Work under the firm-fixed price sections include, but are not limited to, excavation of the emergency spillway, inlet channel,and keyway and toe drain trenches; and excavation, haulage and placement of borrow materials for the compacted fill embankment. The contractor will provide all labor, supervision, equipment and materials necessary to construct the project covered by this contract. Construction services to be provided include site work, and equipment. Labor to be provided includes equipment operator, and all supporting trades.

NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0001AA		1.00	Lump Sum		

Mobilization/Demobilization
FFP - 50% of Mobilization/Demobilization will be paid upon completion of mobilization, the remaining 50% will be paid after final acceptance and demoblization.

NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0001AB		24.00	Lump Sum		

Clearing and Grubbing (N.I.C.)
FFP - LISTED FOR INFORMATION ONLY - NOT IN CONTRACT - WORK WILL BE PREFORMED BY OWNER

NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0001AC		38,600.00	Cubic Yard		

Topsoil Strip & Stockpiling (N.I.C.)
FFP - LISTED FOR INFORMATIONAL ONLY - NOT IN CONTRACT - WORK WILL BE PREFORMED BY OWNER

NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0001AD		38,600.00	Cubic Yard		

Topsoil Redistribution
FFP

NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0001AE		171,070.00	Cubic Yard		

Excavation
FFP - Excavation quantity shall be based on bank (in-place) cubic yards determined by cross-section quantity survey data.

NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0001AF		156,350.00	Cubic Yard		

Compacted Fill
FFP - Compacted fill quantity shall be based on compacted (in-place) cubic yards determined by cross-section quantity survey data.

NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0001AG		2,220.00	Cubic Yard		

Gravel Drain Rock
FFP - Gravel drain rock quantity shall be based on in-place cubic yards determined by cross-section quantity survey data.

NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0001AH		2,100.00	Linear Foot		

Toe Drain Pipe
FFP - 6" Perforated Corregted Toe Drain Piping

NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0001AJ		30.00	Cubic Yard		

Riprap
FFP - Riprap fill quantity shall be based on (in-place) cubic yards determined by cross-section quantity survey data.

NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0001AK		1.00	Lump Sum		

Ctl. Structure & Outlet Pipe
FFP - 54" x 12ga CSP control structure with reinforced concrete base and 36" x12ga CSP outlet pipe.

NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0001AL		20.00	Acre		
	Revegetation (N.I.C.) FFP - LISTED FOR INFORMATION ONLY - NOT IN CONTRACT - WORK WILL BE PERFORMED BY OWNER				

NET AMT

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FIELD OFFICE OVERHEAD

NOTICE TO BIDDERS: For your bid to be responsive, you must declare below the single accounting practice that you apply to contracts to calculate field office overhead for all change orders, modifications and requests for equitable adjustment. Pursuant to Federal Acquisition Regulations (FAR) Parts 31.105(d)(3) and 31.203(d)(1), an accounting practice that varies from modification to modification is not allowable. Select one of the following:

1. TIME DISTRIBUTION BASE FOR A PER DIEM RATE
   If you use this practice, see Special Clause "Field Office Overhead Per Diem Rate" _____

2. DIRECT COST DISTRUBITION BASE FOR A PERCENTAGE MARKUP
   If you use this practice, see Special Clause "Field Office Overhead Percentage Markup" _____

3. OTHER ACCOUNTING PRACTICE THAT IS ALLOWABLE UNDER THE FAR AND THAT USES A SINGLE DISTRIBUTION BASE. _____

YOU MUST DESCRIBE THE ACCOUNTING PRACTICE IN SUFFICIENT DETAIL BELOW TO ALLOW THE CONTRACTING OFFICER TO DETERMINE WHAT ACCOUNTING PRACTICE IS BEING UTILIZED BY YOUR COMPANY AND THAT IT COMPLIES WITH THE FAR.

_____

_____

_____

FAILURE TO FULLY COMPLY WITH THE ABOVE REQUIREMENT OR, IF ALTERNATIVE 3 IS DECLARED AND YOUR DESCRIPTION DOES NOT CLEARLY STATE OR DESCRIBE A CONSISTENT ACCOUNTING PRACTICE USING A SINGLE DISTRIBUTION BASE, WILL BE CAUSE FOR YOUR BID TO BE REJECTED AS NON-RESPONSIVE.

CAUTION!

BEFORE SIGNING AND MAILING THIS BID, please take note of the following, as failure to perform any one of these actions may cause your offer to be rejected.

1. AMENDMENTS: Have you acknowledged receipt of ALL Amendments? If in doubt as to number of amendments issued, please contact our office.

2. SEALED BIDS: Sealed envelopes containing bids shall be marked to show the bidders's name and address, the solicitation number, amendments received, and the date and time bids are due.

3. AMENDED BID PAGES: If any of the Amendments furnished amended bid pages, the amended bid pages must be used in submitting your bid.

4. LATE BIDS: In order for a late mailed bid to be considered, generally it must have been sent by either registered or certified mail not later than 5 calendar days before the receipt of bids date.

5. BID GUARANTEE: Sufficient bid guarantee in proper form must be furnished with your bid, if your bid exceeds $50,000.

6. MISTAKE IN BID: Have you reviewed your bid prices for possible errors in calculations or work left out?

7. TELEGRAPHIC MODIFICATIONS: If you modify your bid by telegram, be sure to allow sufficient time for the telegram to reach us prior to the time set for receipt of bids. Any doubt should be resolved in favor of allowing Extra Time.

8. FACSIMILE BIDS, MODIFICATIONS, OR WITHDRAWALS: Will not be considered.

9. SECTION 00600: Certifications must be completed and submitted with your bid. Furthermore, prior to any award, the apparent low bidder must submit a Small Business and Small Disadvantaged Business Subcontracting Plan, found at the end of Section 00600, which must be approved prior to award.

10. HAND-DELIVERED BID: If bids are hand-delivered, you must be aware of enhanced security requirements in effect in the Federal Building and allow for extra time to clear security. You must have a valid picture ID in order to enter the building. No additional time will be allowed due to security requirements.

11. BUY AMERICAN ACT: All bidders are cautioned that, prior Government conduct notwithstanding, the Contractor's selection of a domestic construction material (as defined in SECTION 00700) which would require the subsequent selection of a foreign construction material for compatibility is not a justification for waiver of the Buy American Act. It is the Contractor's responsibility to verify, prior to submitting the materials for approval, that each system can be built to meet the contract specifications without the use of foreign construction materials.

NOTES:

1) Bid prices must be entered for all items of the Bidding Schedule. Award will be made as a whole to one Contractor.

2) All quantities are estimated.

3) All extensions of the unit prices shown will be subject to verification by the Contracting Officer. In case of variation between the unit price and the extension, the unit price will be considered to be the bid.

4) If a modification to a bid is submitted that provides for a lump sum adjustment to the total cost, the application of the lump sum adjustment to each price in the Bidding Schedule must be stated. If it is not stated, the bidder agrees that the lump sum adjustment shall be applied on a pro rata basis to every price in the Bidding Schedule.

5) Bidder's attention is directed to SECTION 0100 paragraph titled "Arithmetic Discrepancies" wherein are procedures for correction of errors.

6) Bidder's attention is directed to CONTRACT CLAUSE titled "Contract Prices—Bidding Schedules."

7) Award will be made to the low responsible and responsible bidder. Bidder's attention is directed to SECTION 00100 paragraph entitled "Contract Award—Sealed Bidding—Construction" for further details.

8) Bidder's attention is directed to SECTION 01100: GENERAL for special provisions pertaining to this solicitation.

9) Bidder's attention is directed to the CONTRACT CLAUSES, FAR 52.223-9 wherein the apparent low bidder is required to submit a subcontracting small business and small disadvantaged business subcontracting plan. The subcontracting plan shall be submitted in the format identified in SECTION 00100. Submission of the plan is required prior to award. Award will not be made under this solicitation before the plan is approved by the Contracting Officer.

10) Bidder's attention is directed to the CONTRACT CLAUSES, FAR 52.223-9, Certification and Estimate of Percentage of Recovered Material Content for EPA-Designated Items. Certification will be required upon contract completion unless a waiver has been approved by the Contracting Officer. The waiver must be approved prior to contract award.

11) The general outline of the principal features of each item as listed does not in any way limit the responsibility of the bidder for making a thorough investigation of the drawings and specifications to determine the scope of work included in each item. Descriptions of bid items are supplemented as follows:

    Item AA Mobilization/Demobilization

    Item AB Clearing and Grubbing

    Item AC Topsoil Strip & Stockpiling (N.I.C.)

    Item AD Topsoil Redistribution

    Item AE Excavation

    Item AF Compacted Fill

    Item AG Gravel Drain Rock

    Item AH Top Drain Pipe

Item AJ Riprap

Item AK Ctl, Structure & Outlet Pipe

Item AL Revegetation (N.I.C.)

SECTION 00100 Bidding Schedule/Instructions to Bidders

CLAUSES INCORPORATED BY REFERENCE:

52.214-1	Solicitation Definitions--Sealed Bidding	JUL 1987
52.214-3	Amendments To Invitations For Bids	DEC 1989
52.214-4	False Statements In Bids	APR 1984
52.214-5	Submission Of Bids	MAR 1997
52.214-6	Explanation To Prospective Bidders	APR 1984
52.214-7	Late Submissions, Modifications, and Withdrawals of Bids	NOV 1999
52.214-13	Telegraphic Bids	APR 1984
52.214-18	Preparation of Bids-Construction	APR 1984
52.214-19	Contract Award-Sealed Bidding-Construction	AUG 1996
52.214-29	Order Of Precedence--Sealed Bidding	JAN 1986
52.214-34	Submission Of Offers In The English Language	APR 1991
52.214-35	Submission Of Offers In U.S. Currency	APR 1991
52.214-5000	ARITHMETIC DISCREPANCIES	SEP 2000
52.215-1	Instructions to Offerors--Competitive Acquisition	MAY 2001
52.215-16	Facilities Capital Cost of Money	OCT 1997
52.215-20	Requirements for Cost or Pricing Data or Information Other Than Cost or Pricing Data	OCT 1997
52.222-23	Notice of Requirement for Affirmative Action to Ensure Equal Employment Opportunity for Construction	FEB 1999
52.225-12	Notice of Buy American Act Requirement - Construction Materials Under Trade Agreements	FEB 2000
52.229-3	Federal, State And Local Taxes	JAN 1991
52.232-38	Submission of Electronic Funds Transfer Information with Offer	MAY 1999
52.236-28	Preparation of Proposals--Construction	OCT 1997
NWK - FOOH PD	FIELD OFFICE OVERHEAD PER DIEM RATE	JAN 2001

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52.204-6 DATA UNIVERSAL NUMBERING SYSTEM (DUNS) NUMBER (JUN 99)

(a) The offeror shall enter, in the block with its name and address on the cover page of its offer, the annotation "DUNS" followed by the DUNS number that identifies the offeror's name and address exactly as stated in the offer.

(b) If the offeror does not have a DUNS number, it should contact Dun and Bradstreet directly to obtain one. A DUNS number will be provided immediately by telephone at no charge to the offeror. For information on obtaining a DUNS number, the offeror, if located within the United States, should call Dun and Bradstreet at 1-800-333-0505. The offeror should be prepared to provide the following information:

(1) Company name.

(2) Company address.

(3) Company telephone number.

(4) Line of business.

(5) Chief executive officer/key manager.

(6) Date the company was started.

(7) Number of people employed by the company.

(8) Company affiliation.

(c) Offerors located outside the United States may obtain the location and phone number of the local Dun and Bradstreet Information Services office from the Internet Home Page at http://www.customerservice@dnb.com. If an offeror is unable to locate a local service center, it may send an e-mail to Dun and Bradstreet at globalinfo@mail.dnb.com.

(End of provision)

52.211-2 AVAILABILITY OF SPECIFICATIONS LISTED IN THE DOD INDEX OF SPECIFICATIONS AND STANDARDS (DODISS) AND DESCRIPTIONS LISTED IN THE ACQUISITION MANAGEMENT SYSTEMS AND DATA REQUIREMENTS CONTROL LIST, DOD 5010.12-L (DEC 1999)

Copies of specifications, standards, and data item descriptions cited in this solicitation may be obtained--

(a) From the ASSIST database via the Internet at http://assist.daps.mil; or

(b) By submitting a request to the--Department of Defense Single Stock Point (DoDSSP), Building 4, Section D, 700 Robbins Avenue, Philadelphia, PA 19111-5094, Telephone (215) 697-2667/2179, Facsimile (215) 697-1462.

(End of provision)

52.216-1 TYPE OF CONTRACT (APR 1984)

The Government contemplates award of a single Firm Fixed Price Construction contract resulting from this solicitation.

(End of clause)

52.228-1 BID GUARANTEE (SEP 1996)

(a) Failure to furnish a bid guarantee in the proper form and amount, by the time set for opening of bids, may be cause for rejection of the bid.

(b) The bidder shall furnish a bid guarantee in the form of a firm commitment, e.g., bid bond supported by good and sufficient surety or sureties acceptable to the Government, postal money order, certified check, cashier's check, irrevocable letter of credit, or, under Treasury Department regulations, certain bonds or notes of the United States. The Contracting Officer will return bid guarantees, other than bid bonds, (1) to unsuccessful bidders as soon as practicable after the opening of bids, and (2) to the successful bidder upon execution of contractual documents and bonds (including any necessary coinsurance or reinsurance agreements), as required by the bid as accepted.

(c) The amount of the bid guarantee shall be TWENTY PERCENT (20%) percent of the bid price.

(d) If the successful bidder, upon acceptance of its bid by the Government within the period specified for acceptance, fails to execute all contractual documents or furnish executed bond(s) within 10 days after receipt of the forms by the bidder, the Contracting Officer may terminate the contract for default.

(e) In the event the contract is terminated for default, the bidder is liable for any cost of acquiring the work that exceeds the amount of its bid, and the bid guarantee is available to offset the difference.

52.228-2 ADDITIONAL BOND SECURITY (OCT 1997)

The Contractor shall promptly furnish additional security required to protect the Government and persons supplying labor or materials under this contract if--

(a) Any surety upon any bond, or issuing financial institution for other security, furnished with this contract becomes unacceptable to the Government.

(b) Any surety fails to furnish reports on its financial condition as required by the Government;

(c) The contract price is increased so that the penal sum of any bond becomes inadequate in the opinion of the Contracting Officer; or

(d) An irrevocable letter of credit (ILC) used as security will expire before the end of the period of required security. If the Contractor does not furnish an acceptable extension or replacement ILC, or other acceptable substitute, at least 30 days before an ILC's scheduled expiration, the Contracting officer has the right to immediately draw on the ILC.

52.233-2 SERVICE OF PROTEST (AUG 1996)

(a) Protests, as defined in section 33.101 of the Federal Acquisition Regulation, that are filed directly with an agency, and copies of any protests that are filed with the General Accounting Office (GAO), shall be served on the Contracting Officer (addressed as follows) by obtaining written and dated acknowledgment of receipt from

CHARLENE A. POINTS
CONTRACTING OFFICER
USAED, KANSAS CITY
760 FEDERAL BUIDLING
601 E.AST 12TH STREET
KANSAS CITY, MISSOURI 64106-2896

(b) The copy of any protest shall be received in the office designated above within one day of filing a protest with the GAO.

(End of provision)

52.236-27 SITE VISIT (CONSTRUCTION) (FEB 1995)

(a) The clauses at 52.236-2, Differing Site Conditions, and 52.236-3, Site Investigations and Conditions Affecting the Work, will be included in any contract awarded as a result of this solicitation. Accordingly, offerors or quoters are urged and expected to inspect the site where the work will be performed.

(b) Site visits may be arranged during normal duty hours by contacting:
Name: Valerie A. Hansen
Telephone: 816-983-3143

52.252-1 SOLICITATION PROVISIONS INCORPORATED BY REFERENCE (FEB 1998)

This solicitation incorporates one or more solicitation provisions by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. The offeror is cautioned that the listed provisions may include blocks that must be completed by the offeror and submitted with its

quotation or offer. In lieu of submitting the full text of those provisions, the offeror may identify the provision by paragraph identifier and provide the appropriate information with its quotation or offer. Also, the full text of a solicitation provision may be accessed electronically at this/these address(es):

http://www.arnet.gov/far
http://www.acq.osd.mil/dp/dars/dfar/htm1

252.204-7004 REQUIRED CENTRAL CONTRACTOR REGISTRATION.(NOV 2001)

(a) Definitions.

As used in this clause--

(1) Central Contractor Registration (CCR) database means the primary DoD repository for contractor information required for the conduct of business with DoD.

(2) Data Universal Numbering System (DUNS) number means the 9-digit number assigned by Dun and Bradstreet Information Services to identify unique business entities.

(3) Data Universal Numbering System +4 (DUNS+4) number means the DUNS number assigned by Dun and Bradstreet plus a 4-digit suffix that may be assigned by a parent (controlling) business concern. This 4-digit suffix may be assigned at the discretion of the parent business concern for such purposes as identifying subunits or affiliates of the parent business concern.

(4) Registered in the CCR database means that all mandatory information, including the DUNS number or the DUNS+4 number, if applicable, and the corresponding Commercial and Government Entity (CAGE) code, is in the CCR database; the DUNS number and the CAGE code have been validated; and all edits have been successfully completed.

(b)(1) By submission of an offer, the offeror acknowledges the requirement that a prospective awardee must be registered in the CCR database prior to award, during performance, and through final payment of any contract resulting from this solicitation, except for awards to foreign vendors for work to be performed outside the United States.

(2) The offeror shall provide its DUNS or, if applicable, its DUNS+4 number with its offer, which will be used by the Contracting Officer to verify that the offeror is registered in the CCR database.

(3) Lack of registration in the CCR database will make an offeror ineligible for award.

(4) DoD has established a goal of registering an applicant in the CCR database within 48 hours after receipt of a complete and accurate application via the Internet. However, registration of an applicant submitting an application through a method other than the Internet may take up to 30 days. Therefore, offerors that are not registered should consider applying for registration immediately upon receipt of this solicitation.

(c) The Contractor is responsible for the accuracy and completeness of the data within the CCR, and for any liability resulting fromthe Government's reliance on inaccurate or incomplete data. To remain registered in the CCR database after the initial registration, the Contractor is required to confirm on an annual basis that its information in the CCR database is accurate and complete.

(d) Offerors and contractors may obtain information on registration and annual confirmation requirements by calling 1-888-227-2423, or via the Internet at http://www.ccr.gov.

(End of clause)

FIELD OFFICE OVERHEAD PERCENTAGE MARKUP

If any change to the contract, issued pursuant to the changes Clause or otherwise, for which the Government is responsible, causes an increase or decrease in the Contractor's cost of, of the time required for, performance under the contract, the Contracting Officer shall make an equitable adjustment and modify the contract in writing.

Under such equitable adjustment, no per diem rate for field office overhead shall be allowed if the Contractor has elected a percentage markup in keeping with its standard accounting practices. In such a case, payment of field office overhead shall be allowed for any change on a percentage markup basis regardless of whether the completion of the contract is or is not extended by reason of the change, except for modifications issued pursuant to the Default Clause. The Contractor shall provide a detailed breakdown of its proposed increase or decrease of costs as required by Contract Clause DFARS 252.236-7001 MODIFICATION OF PROPOSALS – PRICE BREAKDOWN.

SECTION 00600 Representations & Certifications

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52.203-2 CERTIFICATE OF INDEPENDENT PRICE DETERMINATION (APR 1985)

(a) The offeror certifies that --

(1) The prices in this offer have been arrived at independently, without, for the purpose of restricting competition, any consultation, communication, or agreement with any other offeror or competitor relating to –

(i) Those prices,

(ii) The intention to submit an offer, or

(iii) The methods of factors used to calculate the prices offered:

(2) The prices in this offer have not been and will not be knowingly disclosed by the offeror, directly or indirectly, to any other offeror or competitor before bid opening (in the case of a sealed bid solicitation) or contract award (in the case of a negotiated solicitation) unless otherwise required by law; and

(3) No attempt has been made or will be made by the offeror to induce any other concern to submit or not to submit an offer for the purpose of restricting competition.

(b) Each signature on the offer is considered to be a certification by the signatory that the signatory --

(1) Is the person in the offeror's organization responsible for determining the prices offered in this bid or proposal, and that the signatory has not participated and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) of this provision; or

(2) (i) Has been authorized, in writing, to act as agent for the following principals in certifying that those principals have not participated, and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) of this provison _____ (insert full name of person(s) in the offeror's organization responsible for determining the prices offered in this bid or proposal, and the title of his or her position in the offeror's organization);

(ii) As an authorized agent, does certify that the principals named in subdivision (b)(2)(i) above have not participated, and will not participate, in any action contrary to subparagraphs (a)(1) through (a)(3) above; and

(iii) As an agent, has not personally participated, and will not participate, in any action contrary to subparagraphs (a)(1) through (a)(3) of this provision.

(c) If the offeror deletes or modifies subparagraph (a)(2) of this provision, the offeror must furnish with its offer a signed statement setting forth in detail the circumstances of the disclosure.

(End of provision)

52.204-3 TAXPAYER IDENTIFICATION (OCT 1998)

(a) Definitions.

"Common parent," as used in this provision, means that corporate entity that owns or controls an affiliated group of corporations that files its Federal income tax returns on a consolidated basis, and of which the offeror is a member.

"Taxpayer Identification Number (TIN)," as used in this provision, means the number required by the Internal Revenue Service (IRS) to be used by the offeror in reporting income tax and other returns. The TIN may be either a Social Security Number or an Employer Identification Number.

(b) All offerors must submit the information required in paragraphs (d) through (f) of this provision to comply with debt collection requirements of 31 U.S.C. 7701(c) and 3325(d), reporting requirements of 26 U.S.C. 6041, 6041A, and 6050M, and implementing regulations issued by the IRS. If the resulting contract is subject to the payment reporting requirements described in Federal Acquisition Regulation (FAR) 4.904, the failure or refusal by the offeror to furnish the information may result in a 31 percent reduction of payments otherwise due under the contract.

(c) The TIN may be used by the Government to collect and report on any delinquent amounts arising out of the offeror's relationship with the Government (31 U.S.C. 7701(c)(3)). If the resulting contract is subject to the payment reporting requirements described in FAR 4.904, the TIN provided hereunder may be matched with IRS records to verify the accuracy of the offeror's TIN.

(d) Taxpayer Identification Number (TIN).

___ TIN:._____

___ TIN has been applied for.

___ TIN is not required because:

___ Offeror is a nonresident alien, foreign corporation, or foreign partnership that does not have income effectively connected with the conduct of a trade or business in the United States and does not have an office or place of business or a fiscal paying agent in the United States;

___ Offeror is an agency or instrumentality of a foreign government;

___ Offeror is an agency or instrumentality of the Federal Government.

(e) Type of organization.

___ Sole proprietorship;

___ Partnership;

___ Corporate entity (not tax-exempt);

___ Corporate entity (tax-exempt);

___ Government entity (Federal, State, or local);

___ Foreign government;

___ International organization per 26 CFR 1.6049-4;

___ Other _____

(f) Common parent.

___ Offeror is not owned or controlled by a common parent as defined in paragraph (a) of this provision.

___ Name and TIN of common parent:

Name _____

TIN _____

(End of provision)

52.204-5 WOMEN-OWNED BUSINESS (OTHER THAN SMALL BUSINESS) (MAY 1999)

(a) Definition. Women-owned business concern, as used in this provision, means a concern that is at least 51 percent owned by one or more women; or in the case of any publicly owned business, at least 51 percent of its stock is owned by one or more women; and whose management and daily business operations are controlled by one or more women.

(b) Representation. [Complete only if the offeror is a women-owned business concern and has not represented itself as a small business concern in paragraph (b)(1) of FAR 52.219-1, Small Business Program Representations, of this solicitation.] The offeror represents that it ( ) is a women-owned business concern.

(End of provision)

52.209-5 CERTIFICATION REGARDING DEBARMENT, SUSPENSION, PROPOSED DEBARMENT, AND OTHER RESPONSIBILITY MATTERS (DEC 2001)

(a)(1) The Offeror certifies, to the best of its knowledge and belief, that--

(i) The Offeror and/or any of its Principals --

(A) Are ( ) are not ( ) presently debarred, suspended, proposed for debarment, or declared ineligible for the award of contracts by any Federal agency;

(B) Have ( ) have not ( ), within a three-year period preceding this offer, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, state, or local) contract or subcontract; violation of Federal or state antitrust statutes relating to the submission of offers; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, or receiving stolen property; and

(C) Are ( ) are not ( ) presently indicted for, or otherwise criminally or civilly charged by a governmental entity with, commission of any of the offenses enumerated in subdivision (a)(1)(i)(B) of this provision.

(ii) The Offeror has ( ) has not ( ), within a three-year period preceding this offer, had one or more contracts terminated for default by any Federal agency.

(2) "Principals," for the purposes of this certification, means officers; directors; owners; partners; and, persons having primary management or supervisory responsibilities within a business entity (e.g., general manager; plant manager; head of a subsidiary, division, or business segment, and similar positions).

THIS CERTIFICATION CONCERNS A MATTER WITHIN THE JURISDICTION OF AN AGENCY OF THE UNITED STATES AND THE MAKING OF A FALSE, FICTITIOUS, OR FRAUDULENT CERTIFICATION MAY RENDER THE MAKER SUBJECT TO PROSECUTION UNDER SECTION 1001, TITLE 18, UNITED STATES CODE.

(b) The Offeror shall provide immediate written notice to the Contracting Officer if, at any time prior to contract award, the Offeror learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

(c) A certification that any of the items in paragraph (a) of this provision exists will not necessarily result in withholding of an award under this solicitation. However, the certification will be considered in connection with a determination of the Offeror's responsibility. Failure of the Offeror to furnish a certification or provide such additional information as requested by the Contracting Officer may render the Offeror nonresponsible.

(d) Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by paragraph (a) of this provision. The knowledge and information of an Offeror is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

(e) The certification in paragraph (a) of this provision is a material representation of fact upon which reliance was placed when making award. If it is later determined that the Offeror knowingly rendered an erroneous certification, in addition to other remedies available to the Government, the Contracting Officer may terminate the contract resulting from this solicitation for default.

(End of provision)

52.215-6 PLACE OF PERFORMANCE (OCT 1997)

(a) The offeror or respondent, in the performance of any contract resulting from this solicitation, ( ) intends, ( ) does not intend [check applicable block] to use one or more plants or facilities located at a different address from the address of the offeror or respondent as indicated in this proposal or response to request for information.

(b) If the offeror or respondent checks “intends” in paragraph (a) of this provision, it shall insert in the following spaces the required information:

Place of performance (street address, city, state, county, zip code)	Name and address of owner and operator of the plant or facility if other than offeror or respondent
_____.....	_____
_____.....	_____

52.219-1 SMALL BUSINESS PROGRAM REPRESENTATIONS (MAY 2001)

(a)(1) The North American Industry Classification System (NAICS) code for this acquisition is 234990 – All Other Heavy Construction.

(2) The small business size standard is $27.5 Million.

(3) The small business size standard for a concern which submits an offer in its own name, other than on a construction or service contract, but which proposes to furnish a product which it did not itself manufacture, is 500 employees.

(b) Representations. (1) The offeror represents as part of its offer that it ( ) is, ( ) is not a small business concern.

(2) (Complete only if the offeror represented itself as a small business concern in paragraph (b)(1) of this provision.) The offeror represents, for general statistical purposes, that it ( ) is, ( ) is not a small disadvantaged business concern as defined in 13 CFR 124.1002.

(3) (Complete only if the offeror represented itself as a small business concern in paragraph (b)(1) of this provision.) The offeror represents as part of its offer that it ( ) is, ( ) is not a women-owned small business concern.

(4) (Complete only if the offeror represented itself as a small business concern in paragraph (b)(1) of this provision.) The offeror represents as part of its offer that it ( ) is, ( ) is not a veteran-owned small business concern.

(5) (Complete only if the offeror represented itself as a veteran-owned small business concern in paragraph (b)(4) of this provision.) The offeror represents as part of its offer that it ( ) is, ( ) is not a service-disabled veteran-owned small business concern.

(c) Definitions. As used in this provision--

Service-disabled veteran-owned small business concern--

(1) Means a small business concern--

(i) Not less than 51 percent of which is owned by one or more service-disabled veterans or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more service-disabled veterans; and

(ii) The management and daily business operations of which are controlled by one or more service-disabled veterans or, in the case of a veteran with permanent and severe disability, the spouse or permanent caregiver of such veteran.

(2) Service-disabled veteran means a veteran, as defined in 38 U.S.C. 101(2), with a disability that is service-connected, as defined in 38 U.S.C. 101(16).

"Small business concern," means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding on Government contracts, and qualified as a small business under the criteria in 13 CFR Part 121 and the size standard in paragraph (a) of this provision.

Veteran-owned small business concern means a small business concern--

(1) Not less than 51 percent of which is owned by one or more veterans (as defined at 38 U.S.C. 101(2)) or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more veterans; and

(2) The management and daily business operations of which are controlled by one or more veterans.

"Women-owned small business concern," means a small business concern --

(1) That is at least 51 percent owned by one or more women; or in the case of any publicly owned business, at least 51 percent of the stock of which is owned by one or more women; and

(2) Whose management and daily business operations are controlled by one or more women.

(d) Notice.

(1) If this solicitation is for supplies and has been set aside, in whole or in part, for small business concerns, then the clause in this solicitation providing notice of the set-aside contains restrictions on the source of the end items to be furnished.

(2) Under 15 U.S.C. 645(d), any person who misrepresents a firm's status as a small, HUBZone small, small disadvantaged, or women-owned small business concern in order to obtain a contract to be awarded under the preference programs established pursuant to section 8(a), 8(d), 9, or 15 of the Small Business Act or any other provision of Federal law that specifically references section 8(d) for a definition of program eligibility, shall--

(i) Be punished by imposition of fine, imprisonment, or both;

(ii) Be subject to administrative remedies, including suspension and debarment; and

(iii) Be ineligible for participation in programs conducted under the authority of the Act.

(End of provision)

52.219-19 SMALL BUSINESS CONCERN REPRESENTATION FOR THE SMALL BUSINESS COMPETITIVENESS DEMONSTRATION PROGRAM (OCT 2000)

(a) Definition.

"Emerging small business" as used in this solicitation, means a small business concern whose size is no greater than 50 percent of the numerical size standard applicable to the North American Industry Classification System (NAICS) code assigned to a contracting opportunity.

(b) [Complete only if the Offeror has represented itself under the provision at 52.219-1 as a small business concern under the size standards of this solicitation.] The Offeror [ ] is, [ ] is not an emerging small business.

(c) (Complete only if the Offeror is a small business or an emerging small business, indicating its size range.)

Offeror's number of employees for the past 12 months (check this column if size standard stated in solicitation is expressed in terms of number of employees) or Offeror's average annual gross revenue for the last 3 fiscal years (check this column if size standard stated in solicitation is expressed in terms of annual receipts). (Check one of the following.)

No. of Employees Avg. Annual Gross Revenues

____ 50 or fewer ____ $1 million or less

____ 51 - 100 ____ $1,000,001 - $2 million

____ 101 - 250 ____ $2,000,001 - $3.5 million

____ 251 - 500 ____ $3,500,001 - $5 million

____ 501 - 750 ____ $5,000,001 - $10 million

____ 751 - 1,000 ____ $10,000,001 - $17 million

____ Over 1,000 ____ Over $17 million

(End of provision)

52.219-21 SMALL BUSINESS SIZE REPRESENTATION FOR TARGETED INDUSTRY CATEGORIES UNDER THE SMALL BUSINESS COMPETITIVENESS DEMONSTRATION PROGRAM (MAY 1999)

(Complete only if the Offeror has represented itself under the provision at 52.219-1 as a small business concern under the size standards of this solicitation.)

Offeror's number of employees for the past 12 months (check this column if size standard stated in solicitation is expressed in terms of number of employees) or Offeror's average annual gross revenue for the last 3 fiscal years (check this column if size standard stated in solicitation is expressed in terms of annual receipts). (Check one of the following.)

No. of Employees Avg. Annual Gross Revenues

____ 50 or fewer ____ $1 million or less

____ 51 - 100 ____ $1,000,001 - $2 million

____ 101 - 250 ____ $2,000,001 - $3.5 million

____ 251 - 500 ____ $3,500,001 - $5 million

____ 501 - 750 ____ $5,000,001 - $10 million

____ 751 - 1,000 ____ $10,000,001 - $17 million

____ 17 million

(End of provision)

52.222-21 PROHIBITION OF SEGREGATED FACILITIES (FEB 1999)

(a) Segregated facilities, as used in this clause, means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees, that are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, sex, or national origin because of written or oral policies or employee custom. The term does not include separate or single-user rest rooms or necessary dressing or sleeping areas provided to assure privacy between the sexes.

(b) The Contractor agrees that it does not and will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not and will not permit its employees to perform their services at any location under its control where segregated facilities are maintained. The Contractor agrees that a breach of this clause is a violation of the Equal Opportunity clause in this contract.

(c) The Contractor shall include this clause in every subcontract and purchase order that is subject to the Equal Opportunity clause of this contract.

(End of clause)

52.222-22 PREVIOUS CONTRACTS AND COMPLIANCE REPORTS (FEB 1999)

The offeror represents that --

(a) [ ] It has, [ ] has not participated in a previous contract or subcontract subject to the Equal Opportunity clause of this solicitation;

(b) [ ] It has, [ ] has not, filed all required compliance reports; and

(c) Representations indicating submission of required compliance reports, signed by proposed subcontractors, will be obtained before subcontract awards.

(End of provision)

52.223-13 CERTIFICATION OF TOXIC CHEMICAL RELEA SE REPORTING (OCT 2000)

(a) Submission of this certification is a prerequisite for making or entering into this contract imposed by Executive Order 12969, August 8, 1995.

(b) By signing this offer, the offeror certifies that--

(1) As the owner or operator of facilities that will be used in the performance of this contract that are subject to the filing and reporting requirements described in section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) (42 U.S.C. 11023) and section 6607 of the Pollution Prevention Act of 1990 (PPA) (42 U.S.C. 13106), the offeror will file and continue to file for such facilities for the life of the contract the Toxic Chemical Release Inventory Form (Form R) as described in sections 313(a) and (g) of EPCRA and section 6607 of PPA; or

(2) None of its owned or operated facilities to be used in the performance of this contract is subject to the Form R filing and reporting requirements because each such facility is exempt for at least one of the following reasons: (Check each block that is applicable.)

[ ] (i) The facility does not manufacture, process or otherwise use any toxic chemicals listed under section 313(c) of EPCRA, 42 U.S.C. 11023(c);

[ ] (ii) The facility does not have 10 or more full-time employees as specified in section 313.(b)(1)(A) of EPCRA 42 U.S.C. 11023(b)(1)(A);

[ ] (iii) The facility does not meet the reporting thresholds of toxic chemicals established under section 313(f) of EPCRA, 42 U.S.C. 11023(f) (including the alternate thresholds at 40 CFR 372.27, provided an appropriate certification form has been filed with EPA);

[ ] (iv) The facility does not fall within Standard Industrial Classification Code (SIC) major groups 20 through 39 or their corresponding North American Industry Classification System (NAICS) sectors 31 through 33; or

[ ] (v) The facility is not located within any State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the United States Virgin Islands, the Northern Mariana Islands, or any other territory or possession over which the United States has jurisdiction.

252.209-7001 DISCLOSURE OF OWNERSHIP OR CONTROL BY THE GOVERNMENT OF A TERRORIST COUNTRY (MAR 1998)

(a) "Definitions."

As used in this provision --

(a) "Government of a terrorist country" includes the state and the government of a terrorist country, as well as any political subdivision, agency, or instrumentality thereof.

(2) "Terrorist country" means a country determined by the Secretary of State, under section 6(j)(1)(A) of the Export Administration Act of 1979 (50 U.S.C. App. 2405(j)(i)(A)), to be a country the government of which has repeatedly provided support for such acts of international terrorism. As of the date of this provision, terrorist countries include: Cuba, Iran, Iraq, Libya, North Korea, Sudan, and Syria.

(3) "Significant interest" means --

(i) Ownership of or beneficial interest in 5 percent or more of the firm's or subsidiary's securities. Beneficial interest

includes holding 5 percent or more of any class of the firm's securities in "nominee shares," "street names," or some other method of holding securities that does not disclose the beneficial owner;

(ii) Holding a management position in the firm, such as a director or officer;

(iii) Ability to control or influence the election, appointment, or tenure of directors or officers in the firm;

(iv) Ownership of 10 percent or more of the assets of a firm such as equipment, buildings, real estate, or other tangible assets of the firm; or

(v) Holding 50 percent or more of the indebtness of a firm.

(b) "Prohibition on award."

In accordance with 10 U.S.C. 2327, no contract may be awarded to a firm or a subsidiary of a firm if the government of a terrorist country has a significant interest in the firm or subsidiary or, in the case of a subsidiary, the firm that owns the subsidiary, unless a waiver is granted by the Secretary of Defense.

(c) "Disclosure."

If the government of a terrorist country has a significant interest in the Offeror or a subsidiary of the Offeror, the Offeror shall disclosure such interest in an attachment to its offer. If the Offeror is a subsidiary, it shall also disclose any significant interest the government of a terrorist country has in any firm that owns or controls the subsidiary. The disclosure shall include --

(1) Identification of each government holding a significant interest; and

(2) A description of the significant interest held by each government.

(End of provision)

252.247-7022 REPRESENTATION OF EXTENT OF TRANSPORTATION BY SEA (AUG 1992)

(a) The Offeror shall indicate by checking the appropriate blank in paragraph (b) of this provision whether transportation of supplies by sea is anticipated under the resultant contract. The term supplies is defined in the Transportation of Supplies by Sea clause of this solicitation.

(b) Representation. The Offeror represents that it:

____ (1) Does anticipate that supplies will be transported by sea in the performance of any contract or subcontract resulting from this solicitation.

____ (2) Does not anticipate that supplies will be transported by sea in the performance of any contract or subcontract resulting from this solicitation.

(c) Any contract resulting from this solicitation will include the Transportation of Supplies by Sea clause. If the Offeror represents that it will not use ocean transportation, the resulting contract will also include the Defense FAR Supplement clause at 252.247-7024, Notification of Transportation of Supplies by Sea.

(End of provision)

SECTION 00700 Contract Clauses

CLAUSES INCORPORATED BY REFERENCE:

52.203-5	Covenant Against Contingent Fees	APR 1984
52.203-7	Anti-Kickback Procedures	JUL 1995
52.203-8	Cancellation, Rescission, and Recovery of Funds for Illegal or Improper Activity	JAN 1997
52.203-10	Price Or Fee Adjustment For Illegal Or Improper Activity	JAN 1997
52.203-11	Certification And Disclosure Regarding Payments To Influence Certain Federal Transactions	APR 1991
52.203-11	Certification And Disclosure Regarding Payments To Influence Certain Federal Transactions	APR 1991
52.203-12	Limitation On Payments To Influence Certain Federal Transactions	JUN 1997
52.209-6	Protecting the Government's Interest When Subcontracting With Contractors Debarred, Suspended, or Proposed for Debarment	JUL 1995
52.214-26	Audit and Records--Sealed Bidding	OCT 1997
52.215-21	Requirements for Cost or Pricing Data or Information Other Than Cost or Pricing Data--Modifications	OCT 1997
52.219-4	Notice of Price Evaluation Preference for HUBZone Small Business Concerns	JAN 1999
52.222-3	Convict Labor	AUG 1996
52.222-4	Contract Work Hours and Safety Standards Act - Overtime Compensation	SEP 2000
52.222-6	Davis Bacon Act	FEB 1995
52.222-7	Withholding of Funds	FEB 1988
52.222-8	Payrolls and Basic Records	FEB 1988
52.222-9	Apprentices and Trainees	FEB 1988
52.222-10	Compliance with Copeland Act Requirements	FEB 1988
52.222-11	Subcontracts (Labor Standards)	FEB 1988
52.222-12	Contract Termination-Debarment	FEB 1988
52.222-13	Compliance with Davis-Bacon and Related Act Regulations.	FEB 1988
52.222-14	Disputes Concerning Labor Standards	FEB 1988
52.222-15	Certification of Eligibility	FEB 1988
52.222-26	Equal Opportunity	FEB 1999
52.222-27	Affirmative Action Compliance Requirements for Construction	FEB 1999
52.222-35	Equal Opportunity For Disabled Veterans, Veterans of the Vietnam Era and Other Eligible Veterans	DEC 2001
52.222-36	Affirmative Action For Workers With Disabilities	JUN 1998
52.222-37	Employment Reports On Special Disabled Veterans, Veterans Of The Vietnam Era and Other Eligible Veterans	DEC 2001
52.225-13	Restrictions on Certain Foreign Purchases	JUL 2000
52.233-3	Protest After Award	AUG 1996
52.236-3	Site Investigation and Conditions Affecting the Work	APR 1984
52.236-4	Physical Data	APR 1984
52.236-6	Superintendence by the Contractor	APR 1984
52.236-8	Other Contracts	APR 1984
52.236-10	Operations and Storage Areas	APR 1984
52.236-11	Use and Possession Prior to Completion	APR 1984
52.236-12	Cleaning Up	APR 1984
52.236-13	Accident Prevention	NOV 1991
52.236-15	Schedules for Construction Contracts	APR 1984

52.236-17	Layout of Work	APR 1984
52.236-21	Specifications and Drawings for Construction	FEB 1997
52.236-26	Preconstruction Conference	FEB 1995
52.242-13	Bankruptcy	JUL 1995
52.249-2 Alt I	Termination for Convenience of the Government (Fixed-Price) (Sep 1996) - Alternate I	SEP 1996
252.227-7033	Rights in Shop Drawings	APR 1966
252.227-7033	Rights in Shop Drawings	APR 1966
252.231-7000	Supplemental Cost Principles	DEC 1991
252.243-7001	Pricing Of Contract Modifications	DEC 1991
252.243-7002	Requests for Equitable Adjustment	MAR 1998
252.247-7023	Transportation of Supplies by Sea	MAR 2000
252.247-7024	Notification Of Transportation Of Supplies By Sea	MAR 2000

CLAUSES INCORPORATED BY FULL TEXT

52.225-11 BUY AMERICAN ACT--BALANCE OF PAYMENTS PROGRAM--CONSTRUCTION MATERIALS UNDER TRADE AGREEMENTS (FEB 2002)

(a) Definitions. As used in this clause--

Component means an article, material, or supply incorporated directly into a construction material.

Construction material means an article, material, or supply brought to the construction site by the Contractor or subcontractor for incorporation into the building or work. The term also includes an item brought to the site preassembled from articles, materials, or supplies. However, emergency life safety systems, such as emergency lighting, fire alarm, and audio evacuation systems, that are discrete systems incorporated into a public building or work and that are produced as complete systems, are evaluated as a single and distinct construction material regardless of when or how the individual parts or components of those systems are delivered to the construction site. Materials purchased directly by the Government are supplies, not construction material.

Cost of components means--

(1) For components purchased by the Contractor, the acquisition cost, including transportation costs to the place of incorporation into the construction material (whether or not such costs are paid to a domestic firm), and any applicable duty (whether or not a duty-free entry certificate is issued); or

(2) For components manufactured by the Contractor, all costs associated with the manufacture of the component, including transportation costs as described in paragraph (1) of this definition, plus allocable overhead costs, but excluding profit. Cost of components does not include any costs associated with the manufacture of the end product.

Designated country means any of the following countries: Aruba, Austria, Bangladesh, Belgium, Benin, Bhutan, Botswana, Burkina Faso, Burundi, Canada, Cape Verde, Central African Republic, Chad, Comoros, Denmark, Djibouti, Equatorial Guinea, Finland, France, Gambia, Germany, Greece, Guinea, Guinea-Bissau, Haiti, Hong Kong, Iceland, Ireland, Israel, Italy, Japan.

Kiribati, Korea, Republic of, Lesotho, Liechtenstein, Luxembourg, Malawi, Maldives, Mali, Mozambique, Nepal, Netherlands, Niger, Norway, Portugal, Rwanda.

Sao Tome and Principe, Sierra Leone, Singapore, Somalia, Spain, Sweden, Switzerland, Tanzania U.R., Togo, Tuvalu, Uganda, United Kingdom, Vanuatu, Western Samoa, Yemen.

Designated country construction material means a construction material that--

(1) Is wholly the growth, product, or manufacture of a designated country; or

(2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in a designated country into a new and different construction material distinct from the materials from which it was transformed.

Domestic construction material means--

(1) An unmanufactured construction material mined or produced in the United States; or

(2) A construction material manufactured in the United States, if the cost of its components mined, produced, or manufactured in the United States exceeds 50 percent of the cost of all its components. Components of foreign origin of the same class or kind for which nonavailability determinations have been made are treated as domestic.

Foreign construction material means a construction material other than a domestic construction material.

North American Free Trade Agreement country means Canada or Mexico.

North American Free Trade Agreement country construction material means a construction material that--

(1) Is wholly the growth, product, or manufacture of a North American Free Trade Agreement (NAFTA) country; or

(2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in a NAFTA country into a new and different construction material distinct from the materials from which it was transformed.

United States means the 50 States and the District of Columbia, U.S. territories and possessions, Puerto Rico, the Northern Mariana Islands, and any other place subject to U.S. jurisdiction, but does not include leased bases.

(b) Construction materials. (1) This clause implements the Buy American Act (41 U.S.C. 10a-10d) and the Balance of Payments Program by providing a preference for domestic construction material. In addition, the Contracting Officer has determined that the Trade Agreements Act and the North American Free Trade Agreement (NAFTA) apply to this acquisition. Therefore, the Buy American Act and Balance of Payments Program restrictions are waived for designated country and NAFTA country construction materials.

(2) The Contractor shall use only domestic, designated country, or NAFTA country construction material in performing this contract, except as provided in paragraphs (b)(3) and (b)(4) of this clause.

(3) The requirement in paragraph (b)(2) of this clause does not apply to the construction materials or components listed by the Government as follows: “NONE” .

(4) The Contracting Officer may add other foreign construction material to the list in paragraph (b)(3) of this clause if the Government determines that--

(i) The cost of domestic construction material would be unreasonable. The cost of a particular domestic construction material subject to the restrictions of the Buy American Act is unreasonable when the cost of such material exceeds the cost of foreign material by more than 6 percent. For determination of unreasonable cost under the Balance of Payments Program, the Contracting Officer will use a factor of 50 percent;

(ii) The application of the restriction of the Buy American Act or Balance of Payments Program to a particular construction material would be impracticable or inconsistent with the public interest; or

(iii) The construction material is not mined, produced, or manufactured in the United States in sufficient and reasonably available commercial quantities of a satisfactory quality.

(c) Request for determination of inapplicability of the Buy American Act or Balance of Payments Program. (1)(i) Any Contractor request to use foreign construction material in accordance with paragraph (b)(4) of this clause shall include adequate information for Government evaluation of the request, including--

(A) A description of the foreign and domestic construction materials;

(B) Unit of measure;

(C) Quantity;

(D) Price;

(E) Time of delivery or availability;

(F) Location of the construction project;

(G) Name and address of the proposed supplier; and

(H) A detailed justification of the reason for use of foreign construction materials cited in accordance with paragraph (b)(3) of this clause.

(ii) A request based on unreasonable cost shall include a reasonable survey of the market and a completed price comparison table in the format in paragraph (d) of this clause.

(iii) The price of construction material shall include all delivery costs to the construction site and any applicable duty (whether or not a duty-free certificate may be issued).

(iv) Any Contractor request for a determination submitted after contract award shall explain why the Contractor could not reasonably foresee the need for such determination and could not have requested the determination before contract award. If the Contractor does not submit a satisfactory explanation, the Contracting Officer need not make a determination.

(2) If the Government determines after contract award that an exception to the Buy American Act or Balance of Payments Program applies and the Contracting Officer and the Contractor negotiate adequate consideration, the Contracting Officer will modify the contract to allow use of the foreign construction material. However, when the basis for the exception is the unreasonable price of a domestic construction material, adequate consideration is not less than the differential established in paragraph (b)(4)(i) of this clause.

(3) Unless the Government determines that an exception to the Buy American Act or Balance of Payments Program applies, use of foreign construction material is noncompliant with the Buy American Act or Balance of Payments Program.

(d) Data. To permit evaluation of requests under paragraph (c) of this clause based on unreasonable cost, the Contractor shall include the following information and any applicable supporting data based on the survey of suppliers:

Foreign and Domestic Construction Materials Price Comparison

Construction material description	Unit of measure	Quantity	Price (dollars) \1\
Item 1:			
Foreign construction material....	.....	.....	.....
Domestic construction material...	.....	.....	.....

Item 2:
Foreign construction material.... ....
Domestic construction material... ....

\1\ Include all delivery costs to the construction site and any applicable duty (whether or not a duty-free entry certificate is issued).
List name, address, telephone number, and contact for suppliers surveyed. Attach copy of response; if oral, attach summary.
Include other applicable supporting information.

(End of clause)

52.228-15 PERFORMANCE AND PAYMENT BONDS--CONSTRUCTION (JUL 2000)-

(a) Definitions. As used in this clause--

Original contract price means the award price of the contract; or, for requirements contracts, the price payable for the estimated total quantity; or, for indefinite-quantity contracts, the price payable for the specified minimum quantity. Original contract price does not include the price of any options, except those options exercised at the time of contract award.

(b) Amount of required bonds. Unless the resulting contract price is $100,000 or less, the successful offeror shall furnish performance and payment bonds to the Contracting Officer as follows:

(1) Performance bonds (Standard Form 25). The penal amount of performance bonds at the time of contract award shall be 100 percent of the original contract price.

(2) Payment Bonds (Standard Form 25-A). The penal amount of payment bonds at the time of contract award shall be 100 percent of the original contract price.

(3) Additional bond protection. (i) The Government may require additional performance and payment bond protection if the contract price is increased. The increase in protection generally will equal 100 percent of the increase in contract price.

(ii) The Government may secure the additional protection by directing the Contractor to increase the penal amount of the existing bond or to obtain an additional bond.

(c) Furnishing executed bonds. The Contractor shall furnish all executed bonds, including any necessary reinsurance agreements, to the Contracting Officer, within the time period specified in the Bid Guarantee provision of the solicitation, or otherwise specified by the Contracting Officer, but in any event, before starting work.

(d) Surety or other security for bonds. The bonds shall be in the form of firm commitment, supported by corporate sureties whose names appear on the list contained in Treasury Department Circular 570, individual sureties, or by other acceptable security such as postal money order, certified check, cashier's check, irrevocable letter of credit, or, in accordance with Treasury Department regulations, certain bonds or notes of the United States. Treasury Circular 570 is published in the Federal Register or may be obtained from the U.S. Department of Treasury, Financial Management Service, Surety Bond Branch, 401 14th Street, NW, 2nd Floor, West Wing, Washington, DC 20227.

(e) Notice of subcontractor waiver of protection (40 U.S.C. 270b(c). Any waiver of the right to sue on the payment bond is void unless it is in writing, signed by the person whose right is waived, and executed after such person has first furnished labor or material for use in the performance of the contract.

(End of clause)

52.232-5 PAYMENTS UNDER FIXED-PRICE CONSTRUCTION CONTRACTS (MAY 1997)

(a) Payment of price. The Government shall pay the Contractor the contract price as provided in this contract.

(b) Progress payments. The Government shall make progress payments monthly as the work proceeds, or at more frequent intervals as determined by the Contracting Officer, on estimates of work accomplished which meets the standards of quality established under the contract, as approved by the Contracting Officer.

(1) The Contractor's request for progress payments shall include the following substantiation:

(i) An itemization of the amounts requested, related to the various elements of work required by the contract covered by the payment requested.

(ii) A listing of the amount included for work performed by each subcontractor under the contract.

(iii) A listing of the total amount of each subcontract under the contract.

(iv) A listing of the amounts previously paid to each such subcontractor under the contract.

(v) Additional supporting data in a form and detail required by the Contracting Officer.

(2) In the preparation of estimates, the Contracting Officer may authorize material delivered on the site and preparatory work done to be taken into consideration. Material delivered to the Contractor at locations other than the site also may be taken into consideration if--

(i) Consideration is specifically authorized by this contract; and

(ii) The Contractor furnishes satisfactory evidence that it has acquired title to such material and that the material will be used to perform this contract.

(c) Contractor certification. Along with each request for progress payments, the Contractor shall furnish the following certification, or payment shall not be made: (However, if the Contractor elects to delete paragraph (c)(4) from the certification, the certification is still acceptable.)

I hereby certify, to the best of my knowledge and belief, that--

(1) The amounts requested are only for performance in accordance with the specifications, terms, and conditions of the contract;

(2) Payments to subcontractors and suppliers have been made from previous payments received under the contract, and timely payments will be made from the proceeds of the payment covered by this certification, in accordance with subcontract agreements and the requirements of chapter 39 of Title 31, United States Code;

(3) This request for progress payments does not include any amounts which the prime contractor intends to withhold or retain from a subcontractor or supplier in accordance with the terms and conditions of the subcontract; and

(4) This certification is not to be construed as final acceptance of a subcontractor's performance.

_____

(Name)

_____

(Title)

_____

(Date)

(d) Refund of unearned amounts. If the Contractor, after making a certified request for progress payments, discovers that a portion or all of such request constitutes a payment for performance by the Contractor that fails to conform to the specifications, terms, and conditions of this contract (hereinafter referred to as the "unearned amount"), the Contractor shall--

(1) Notify the Contracting Officer of such performance deficiency; and

(2) Be obligated to pay the Government an amount (computed by the Contracting Officer in the manner provided in paragraph (j) of this clause) equal to interest on the unearned amount from the 8th day after the date of receipt of the unearned amount until--

(i) The date the Contractor notifies the Contracting Officer that the performance deficiency has been corrected; or

(ii) The date the Contractor reduces the amount of any subsequent certified request for progress payments by an amount equal to the unearned amount.

(e) Retainage. If the Contracting Officer finds that satisfactory progress was achieved during any period for which a progress payment is to be made, the Contracting Officer shall authorize payment to be made in full. However, if satisfactory progress has not been made, the Contracting Officer may retain a maximum of 10 percent of the amount of the payment until satisfactory progress is achieved. When the work is substantially complete, the Contracting Officer may retain from previously withheld funds and future progress payments that amount the Contracting Officer considers adequate for protection of the Government and shall release to the Contractor all the remaining withheld funds. Also, on completion and acceptance of each separate building, public work, or other division of the contract, for which the price is stated separately in the contract, payment shall be made for the completed work without retention of a percentage.

(f) Title, liability, and reservation of rights. All material and work covered by progress payments made shall, at the time of payment, become the sole property of the Government, but this shall not be construed as --

(1) Relieving the Contractor from the sole responsibility for all material and work upon which payments have been made or the restoration of any damaged work; or

(2) Waiving the right of the Government to require the fulfillment of all of the terms of the contract.

(g) Reimbursement for bond premiums. In making these progress payments, the Government shall, upon request, reimburse the Contractor for the amount of premiums paid for performance and payment bonds (including coinsurance and reinsurance agreements, when applicable) after the Contractor has furnished evidence of full payment to the surety. The retainage provisions in paragraph (e) of this clause shall not apply to that portion of progress payments attributable to bond premiums.

(h) Final payment. The Government shall pay the amount due the Contractor under this contract after--

(1) Completion and acceptance of all work;

(2) Presentation of a properly executed voucher; and

(3) Presentation of release of all claims against
the Government arising by virtue of this contract, other than claims, in stated amounts, that the Contractor has specifically excepted from the operation of the release. A release may also be required of the assignee if the Contractor's claim to amounts payable under this contract has been assigned under the Assignment of Claims Act of

1940 (31 U.S.C. 3727 and 41 U.S.C. 15).

(i) Limitation because of undefinitized work. Notwithstanding any provision of this contract, progress payments shall not exceed 80 percent on work accomplished on undefinitized contract actions. A "contract action" is any action resulting in a contract, as defined in FAR Subpart 2.1, including contract modifications for additional supplies or services, but not including contract modifications that are within the scope and under the terms of the contract, such as contract modifications issued pursuant to the Changes clause, or funding and other administrative changes.

(j) Interest computation on unearned amounts. In accordance with 31 U.S.C. 3903(c)(1), the amount payable under subparagraph (d)(2) of this clause shall be--

(1) Computed at the rate of average bond equivalent rates of 91-day Treasury bills auctioned at the most recent auction of such bills prior to the date the Contractor receives the unearned amount; and

(2) Deducted from the next available payment to the Contractor.

52.232-27 PROMPT PAYMENT FOR CONSTRUCTION CONTRACTS (FEB 2002)

Notwithstanding any other payment terms in this contract, the Government will make invoice payments under the terms and conditions specified in this clause. The Government considers payment as being made on the day a check is dated or the date of an electronic funds transfer. Definitions of pertinent terms are set forth in sections 2.101, 32.001, and 32.902 of the Federal Acquisition Regulation. All days referred to in this clause are calendar days, unless otherwise specified. (However, see paragraph (a)(3) concerning payments due on Saturdays, Sundays, and legal holidays.)

(a) Invoice payments--(1) Types of invoice payments. For purposes of this clause, there are several types of invoice payments that may occur under this contract, as follows:

(i) Progress payments, if provided for elsewhere in this contract, based on Contracting Officer approval of the estimated amount and value of work or services performed, including payments for reaching milestones in any project.

(A) The due date for making such payments is 14 days after the designated billing office receives a proper payment request. If the designated billing office fails to annotate the payment request with the actual date of receipt at the time of receipt, the payment due date is the 14th day after the date of the Contractor's payment request, provided the designated billing office receives a proper payment request and there is no disagreement over quantity, quality, or Contractor compliance with contract requirements.

(B) The due date for payment of any amounts retained by the Contracting Officer in accordance with the clause at 52.232-5, Payments Under Fixed-Price Construction Contracts, is as specified in the contract or, if not specified, 30 days after approval by the Contracting Officer for release to the Contractor.

(ii) Final payments based on completion and acceptance of all work and presentation of release of all claims against the Government arising by virtue of the contract, and payments for partial deliveries that have been accepted by the Government (e.g., each separate building, public work, or other division of the contract for which the price is stated separately in the contract).

(A) The due date for making such payments is the later of the following two events:

(1) The 30th day after the designated billing office receives a proper invoice from the Contractor.

(2) The 30th day after Government acceptance of the work or services completed by the Contractor. For a final invoice when the payment amount is subject to contract settlement actions (e.g., release of claims), acceptance is deemed to occur on the effective date of the contract settlement.

(B) If the designated billing office fails to annotate the invoice with the date of actual receipt at the time of receipt, the invoice payment due date is the 30th day after the date of the Contractor's invoice, provided the designated billing office receives a proper invoice and there is no disagreement over quantity, quality, or Contractor compliance with contract requirements.

(2) Contractor's invoice. The Contractor shall prepare and submit invoices to the designated billing office specified in the contract. A proper invoice must include the items listed in paragraphs (a)(2)(i) through (a)(2)(xi) of this clause. If the invoice does not comply with these requirements, the designated billing office must return it within 7 days after receipt, with the reasons why it is not a proper invoice. When computing any interest penalty owed the Contractor, the Government will take into account if the Government notifies the Contractor of an improper invoice in an untimely manner.

(i) Name and address of the Contractor.

(ii) Invoice date and invoice number. (The Contractor should date invoices as close as possible to the date of mailing or transmission.)

(iii) Contract number or other authorization for work or services performed (including order number and contract line item number).

(iv) Description of work or services performed.

(v) Delivery and payment terms (e.g., discount for prompt payment terms).

(vi) Name and address of Contractor official to whom payment is to be sent (must be the same as that in the contract or in a proper notice of assignment).

(vii) Name (where practicable), title, phone number, and mailing address of person to notify in the event of a defective invoice.

(viii) For payments described in paragraph (a)(1)(i) of this clause, substantiation of the amounts requested and certification in accordance with the requirements of the clause at 52.232-5, Payments Under Fixed-Price Construction Contracts.

(ix) Taxpayer Identification Number (TIN). The Contractor shall include its TIN on the invoice only if required elsewhere in this contract.

(x) Electronic funds transfer (EFT) banking information.

(A) The Contractor shall include EFT banking information on the invoice only if required elsewhere in this contract.

(B) If EFT banking information is not required to be on the invoice, in order for the invoice to be a proper invoice, the Contractor shall have submitted correct EFT banking information in accordance with the applicable solicitation provision (e.g., 52.232-38, Submission of Electronic Funds Transfer Information with Offer), contract clause (e.g., 52.232-33, Payment by Electronic Funds Transfer--Central Contractor Registration, or 52.232-34, Payment by Electronic Funds Transfer--Other Than Central Contractor Registration), or applicable agency procedures.

(C) EFT banking information is not required if the Government waived the requirement to pay by EFT.

(xi) Any other information or documentation required by the contract.

(3) Interest penalty. The designated payment office will pay an interest penalty automatically, without request from the Contractor, if payment is not made by the due date and the conditions listed in paragraphs (a)(3)(i) through (a)(3)(iii) of this clause are met, if applicable. However, when the due date falls on a Saturday, Sunday, or legal holiday, the designated payment office may make payment on the following working day without incurring a late payment interest penalty.

(i) The designated billing office received a proper invoice.

(ii) The Government processed a receiving report or other Government documentation authorizing payment and there was no disagreement over quantity, quality, Contractor compliance with any contract term or condition, or requested progress payment amount.

(iii) In the case of a final invoice for any balance of funds due the Contractor for work or services performed, the amount was not subject to further contract settlement actions between the Government and the Contractor.

(4) Computing penalty amount. The Government will compute the interest penalty in accordance with the Office of Management and Budget prompt payment regulations at 5 CFR part 1315.

(i) For the sole purpose of computing an interest penalty that might be due the Contractor for payments described in paragraph (a)(1)(ii) of this clause, Government acceptance or approval is deemed to occur constructively on the 7th day after the Contractor has completed the work or services in accordance with the terms and conditions of the contract. If actual acceptance or approval occurs within the constructive acceptance or approval period, the Government will base the determination of an interest penalty on the actual date of acceptance or approval. Constructive acceptance or constructive approval requirements do not apply if there is a disagreement over quantity, quality, or Contractor compliance with a contract provision. These requirements also do not compel Government officials to accept work or services, approve Contractor estimates, perform contract administration functions, or make payment prior to fulfilling their responsibilities.

(ii) The prompt payment regulations at 5 CFR 1315.10(c) do not require the Government to pay interest penalties if payment delays are due to disagreement between the Government and the Contractor over the payment amount or other issues involving contract compliance, or on amounts temporarily withheld or retained in accordance with the terms of the contract. The Government and the Contractor shall resolve claims involving disputes, and any interest that may be payable in accordance with the clause at FAR 52.233-1, Disputes.

(5) Discounts for prompt payment. The designated payment office will pay an interest penalty automatically, without request from the Contractor, if the Government takes a discount for prompt payment improperly. The Government will calculate the interest penalty in accordance with the prompt payment regulations at 5 CFR part 1315.

(6) Additional interest penalty. (i) The designated payment office will pay a penalty amount, calculated in accordance with the prompt payment regulations at 5 CFR part 1315 in addition to the interest penalty amount only if--

(A) The Government owes an interest penalty of $1 or more;

(B) The designated payment office does not pay the interest penalty within 10 days after the date the invoice amount is paid; and

(C) The Contractor makes a written demand to the designated payment office for additional penalty payment, in accordance with paragraph (a)(6)(ii) of this clause, postmarked not later than 40 days after the date the invoice amount is paid.

(ii)(A) The Contractor shall support written demands for additional penalty payments with the following data. The Government will not request any additional data. The Contractor shall--

(1) Specifically assert that late payment interest is due under a specific invoice, and request payment of all overdue late payment interest penalty and such additional penalty as may be required;

(2) Attach a copy of the invoice on which the unpaid late payment interest was due; and

(3) State that payment of the principal has been received, including the date of receipt.

(B) If there is no postmark or the postmark is illegible --

(1) The designated payment office that receives the demand will annotate it with the date of receipt provided the demand is received on or before the 40th day after payment was made; or

(2) If the designated payment office fails to make the required annotation, the Government will determine the demand's validity based on the date the Contractor has placed on the demand, provided such date is no later than the 40th day after payment was made.

(b) Contract financing payments. If this contract provides for contract financing, the Government will make contract financing payments in accordance with the applicable contract financing clause.

(c) Subcontract clause requirements. The Contractor shall include in each subcontract for property or services (including a material supplier) for the purpose of performing this contract the following:

(1) Prompt payment for subcontractors. A payment clause that obligates the Contractor to pay the subcontractor for satisfactory performance under its subcontract not later than 7 days from receipt of payment out of such amounts as are paid to the Contractor under this contract.

(2) Interest for subcontractors. An interest penalty clause that obligates the Contractor to pay to the subcontractor an interest penalty for each payment not made in accordance with the payment clause--

(i) For the period beginning on the day after the required payment date and ending on the date on which payment of the amount due is made; and

(ii) Computed at the rate of interest established by the Secretary of the Treasury, and published in the Federal Register, for interest payments under section 12 of the Contract Disputes Act of 1978 (41 U.S.C. 611) in effect at the time the Contractor accrues the obligation to pay an interest penalty.

(3) Subcontractor clause flowdown. A clause requiring each subcontractor to use:

(i) Include a payment clause and an interest penalty clause conforming to the standards set forth in paragraphs (c)(1) and (c)(2) of this clause in each of its subcontracts; and

(ii) Require each of its subcontractors to include such clauses in their subcontracts with each lower-tier subcontractor or supplier.

(d) Subcontract clause interpretation. The clauses required by paragraph (c) of this clause shall not be construed to impair the right of the Contractor or a subcontractor at any tier to negotiate, and to include in their subcontract, provisions that--

(1) Retainage permitted. Permit the Contractor or a subcontractor to retain (without cause) a specified percentage of each progress payment otherwise due to a subcontractor for satisfactory performance under the subcontract without incurring any obligation to pay a late payment interest penalty, in accordance with terms and conditions agreed to by the parties to the subcontract, giving such recognition as the parties deem appropriate to the ability of a subcontractor to furnish a performance bond and a payment bond;

(2) Withholding permitted. Permit the Contractor or subcontractor to make a determination that part or all of the subcontractor's request for payment may be withheld in accordance with the subcontract agreement; and

(3) Withholding requirements. Permit such withholding without incurring any obligation to pay a late payment penalty if--

(i) A notice conforming to the standards of paragraph (g) of this clause previously has been furnished to the subcontractor; and

(ii) The Contractor furnishes to the Contracting Officer a copy of any notice issued by a Contractor pursuant to paragraph (d)(3)(i) of this clause.

(e) Subcontractor withholding procedures. If a Contractor, after making a request for payment to the Government but before making a payment to a subcontractor for the subcontractor's performance covered by the payment request, discovers that all or a portion of the payment otherwise due such subcontractor is subject to withholding from the subcontractor in accordance with the subcontract agreement, then the Contractor shall--

(1) Subcontractor notice. Furnish to the subcontractor a notice conforming to the standards of paragraph (g) of this clause as soon as practicable upon ascertaining the cause giving rise to a withholding, but prior to the due date for subcontractor payment;

(2) Contracting Officer notice. Furnish to the Contracting Officer, as soon as practicable, a copy of the notice furnished to the subcontractor pursuant to paragraph (e)(1) of this clause;

(3) Subcontractor progress payment reduction. Reduce the subcontractor's progress payment by an amount not to exceed the amount specified in the notice of withholding furnished under paragraph (e)(1) of this clause;

(4) Subsequent subcontractor payment. Pay the subcontractor as soon as practicable after the correction of the identified subcontract performance deficiency, and--

(i) Make such payment within--

(A) Seven days after correction of the identified subcontract performance deficiency (unless the funds therefor must be recovered from the Government because of a reduction under paragraph
(e)(5)(i)) of this clause; or

(B) Seven days after the Contractor recovers such funds from the Government; or

(ii) Incur an obligation to pay a late payment interest penalty computed at the rate of interest established by the Secretary of the Treasury, and published in the Federal Register, for interest payments under section 12 of the Contracts Disputes Act of 1978 (41 U.S.C. 611) in effect at the time the Contractor accrues the obligation to pay an interest penalty;

(5) Notice to Contracting Officer. Notify the Contracting Officer upon--

(i) Reduction of the amount of any subsequent certified application for payment; or

(ii) Payment to the subcontractor of any withheld amounts of a progress payment, specifying--

(A) The amounts withheld under paragraph (e)(1) of this clause; and

(B) The dates that such withholding began and ended; and

(6) Interest to Government. Be obligated to pay to the Government an amount equal to interest on the withheld payments (computed in the manner provided in 31 U.S.C. 3903(c)(1)), from the 8th day after receipt of the withheld amounts from the Government until--

(i) The day the identified subcontractor performance deficiency is corrected; or

(ii) The date that any subsequent payment is reduced under paragraph (e)(5)(i) of this clause.

(f) Third-party deficiency reports--(1) Withholding from subcontractor. If a Contractor, after making payment to a first-tier subcontractor, receives from a supplier or subcontractor of the first-tier subcontractor (hereafter referred to as a "second-tier subcontractor") a written notice in accordance with section 2 of the Act of August 24, 1935 (40 U.S.C. 270b, Miller Act), asserting a deficiency in such first-tier subcontractor's performance under the contract for which the Contractor may be ultimately liable, and the Contractor determines that all or a portion of future payments otherwise due such first-tier subcontractor is subject to withholding in accordance with the subcontract agreement, the Contractor may, without incurring an obligation to pay an interest penalty under paragraph (e)(6) of this clause--

(i) Furnish to the first-tier subcontractor a notice conforming to the standards of paragraph (g) of this clause as soon as practicable upon making such determination; and

(ii) Withhold from the first-tier subcontractor's next available progress payment or payments an amount not to exceed the amount specified in the notice of withholding furnished under paragraph (f)(1)(i) of this clause.

(2) Subsequent payment or interest charge. As soon as practicable, but not later than 7 days after receipt of satisfactory written notification that the identified subcontract performance deficiency has been corrected, the Contractor shall--

(i) Pay the amount withheld under paragraph (f)(1)(ii) of this clause to such first-tier subcontractor; or

(ii) Incur an obligation to pay a late payment interest penalty to such first-tier subcontractor computed at the rate of interest established by the Secretary of the Treasury, and published in the Federal Register, for interest payments under section 12 of the Contracts DisputesAct of 1978 (41 U.S.C. 611) in effect at the time the Contractor accrues the obligation to pay an interest penalty.

(g) Written notice of subcontractor withholding. The Contractor shall issue a written notice of any withholding to a subcontractor (with a copy furnished to the Contracting Officer), specifying--

(1) The amount to be withheld;

(2) The specific causes for the withholding under the terms of the subcontract; and

(3) The remedial actions to be taken by the subcontractor in order to receive payment of the amounts withheld.

(h) Subcontractor payment entitlement. The Contractor may not request payment from the Government of any amount withheld or retained in accordance with paragraph (d) of this clause until such time as the Contractor has determined and certified to the Contracting Officer that the subcontractor is entitled to the payment of such amount.

(i) Prime-subcontractor disputes. A dispute between the Contractor and subcontractor relating to the amount or entitlement of a subcontractor to a payment or a late payment interest penalty under a clause included in the subcontract pursuant to paragraph (c) of this clause does not constitute a dispute to which the Government is a party. The Government may not be interpleaded in any judicial or administrative proceeding involving such a dispute.

(j) Preservation of prime-subcontractor rights. Except as provided in paragraph (i) of this clause, this clause shall not limit or impair any contractual, administrative, or judicial remedies otherwise available to the Contractor or a subcontractor in the event of a dispute involving late payment or nonpayment by the Contractor or deficient subcontract performance or nonperformance by a subcontractor.

(k) Non-recourse for prime contractor interest penalty. The Contractor's obligation to pay an interest penalty to a subcontractor pursuant to the clauses included in a subcontract under paragraph (c) of this clause shall not be construed to be an obligation of the Government for such interest penalty. A cost-reimbursement claim may not include any amount for reimbursement of such interest penalty.

(l) Overpayments. If the Contractor becomes aware of a duplicate payment or that the Government has otherwise overpaid on an invoice payment, the Contractor shall immediately notify the Contracting Officer and request instructions for disposition of the overpayment.

(End of clause)

52.233-1 DISPUTES. (DEC 1998)

(a) This contract is subject to the Contract Disputes Act of 1978, as amended (41 U.S.C. 601-613).

(b) Except as provided in the Act, all disputes arising under or relating to this contract shall be resolved under this clause.

(c) "Claim," as used in this clause, means a written demand or written assertion by one of the contracting parties seeking, as a matter of right, the payment of money in a sum certain, the adjustment or interpretation of contract terms, or other relief arising under or relating to this contract. A claim arising under a contract, unlike a claim relating to that contract, is a claim that can be resolved under a contract clause that provides for the relief sought by the claimant. However, a written demand or written assertion by the Contractor seeking the payment of money exceeding $100,000 is not a claim under the Act until certified as required by subparagraph (d)(2) of this clause. A voucher, invoice, or other routine request for payment that is not in dispute when submitted is not a claim under the Act. The submission may be converted to a claim under the Act, by complying with the submission and certification requirements of this clause, if it is disputed either as to liability or amount or is not acted upon in a reasonable time.

(d)(1) A claim by the Contractor shall be made in writing and, unless otherwise stated in this contract, submitted within 6 years after accrual of the claim to the Contracting Officer for a written decision. A claim by the Government against the Contractor shall be subject to a written decision by the Contracting Officer.

(2)(i) The contractors shall provide the certification specified in subparagraph (d)(2)(iii) of this clause when submitting any claim -

(A) Exceeding $100,000; or

(B) Regardless of the amount claimed, when using -

(1) Arbitration conducted pursuant to 5 U.S.C. 575-580; or

(2) Any other alternative means of dispute resolution (ADR) technique that the agency elects to handle in accordance with the Administrative Dispute Resolution Act (ADRA).

(ii) The certification requirement does not apply to issues in controversy that have not been submitted as all or part of a claim.

(iii) The certification shall state as follows: "I certify that the claim is made in good faith; that the supporting data are accurate and complete to the best of my knowledge and belief; that the amount requested accurately reflects the contract adjustment for which the Contractor believes the Government is liable; and that I am duly authorized to certify the claim on behalf of the Contractor.

(3) The certification may be executed by any person duly authorized to bind the Contractor with respect to the claim.

(e) For Contractor claims of $100,000 or less, the Contracting Officer must, if requested in writing by the Contractor, render a decision within 60 days of the request. For Contractor-certified claims over $100,000, the Contracting Officer must, within 60 days, decide the claim or notify the Contractor of the date by which the decision will be made.

(f) The Contracting Officer's decision shall be final unless the Contractor appeals or files a suit as provided in the Act.

(g) If the claim by the Contractor is submitted to the Contracting Officer or a claim by the Government is presented to the Contractor, the parties, by mutual consent, may agree to use alternative disput resolution (ADR). If the Contractor refuses an offer for ADR, the Contractor shall inform the Contracting Officer, in writing, of the Contractor's specific reasons for rejecting the request.

(h) The Government shall pay interest on the amount found due and unpaid from (1) the date the Contracting Officer receives the claim (certified, if required); or (2) the date that payment otherwise would be due, if that date is later, until the date of payment. With regard to claims having defective certifications, as defined in (FAR) 48 CFR 33.201, interest shall be paid from the date that the Contracting Officer initially receives the claim. Simple interest on claims shall be paid at the rate, fixed by the Secretary of the Treasury as provided in the Act, which is applicable to the period during which the Contracting Officer receives the claim and then at the rate applicable for each 6-month period as fixed by the Treasury Secretary during the pendency of the claim.

(i) The Contractor shall proceed diligently with performance of this contract, pending final resolution of any request for relief, claim, appeal, or action arising under the contract, and comply with any decision of the Contracting Officer.

(End of clause)

52.236-1 PERFORMANCE OF WORK BY THE CONTRACTOR (APR 1984)

The Contractor shall perform on the site, and with its own organization, work equivalent to at least TWENTY FIVE (25) percent of the total amount of work to be performed under the contract. This percentage may be reduced by a supplemental agreement to this contract if, during performing the work, the Contractor requests a reduction and the Contracting Officer determines that the reduction would be to the advantage of the Government.

52.236-2 DIFFERING SITE CONDITIONS (APR 1984)

(a) The Contractor shall promptly, and before the conditions are disturbed, give a written notice to the Contracting Officer of

(1) subsurface or latent physical conditions at the site which differ materially from those indicated in this contract, or

(2) unknown physical conditions at the site, of an unusual nature, which differ materially from those ordinarily encountered and generally recognized as inhering in work of the character provided for in the contract.

(b) The Contracting Officer shall investigate the site conditions promptly after receiving the notice. If the conditions do materially so differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performing any part of the work under this contract, whether or not changed as a result of the conditions, an equitable adjustment shall be made under this clause and the contract modified in writing accordingly.

(c) No request by the Contractor for an equitable adjustment to the contract under this clause shall be allowed, unless the Contractor has given the written notice required; provided, that the time prescribed in (a) above for giving written notice may be extended by the Contracting Officer.

(d) No request by the Contractor for an equitable adjustment to the contract for differing site conditions shall be

allowed if made after final payment under this contract.

52.236-7 PERMITS AND RESPONSIBILITIES (NOV 1991)

The Contractor shall, without additional expense to the Government, be responsible for obtaining any necessary licenses and permits, and for complying with any Federal, State, and municipal laws, codes, and regulations applicable to the performance of the work. The Contractor shall also be responsible for all damages to persons or property that occur as a result of the Contractor's fault or negligence. The Contractor shall also be responsible for all materials delivered and work performed until completion and acceptance of the entire work, except for any completed unit of work which may have been accepted under the contract.

52.236-9 PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS (APR 1984)

(a) The Contractor shall preserve and protect all structures, equipment, and vegetation (such as trees, shrubs, and grass) on or adjacent to the work site, which are not to be removed and which do not unreasonably interfere with the work required under this contract. The Contractor shall only remove trees when specifically authorized to do so, and shall avoid damaging vegetation that will remain in place. If any limbs or branches of trees are broken during contract performance, or by the careless operation of equipment, or by workmen, the Contractor shall trim those limbs or branches with a clean cut and paint the cut with a tree-pruning compound as directed by the Contracting Officer.

(b) The Contractor shall protect from damage all existing improvements and utilities

(1) at or near the work site, and

(2) on adjacent property of a third party, the locations of which are made known to or should be known by the Contractor. The Contractor shall repair any damage to those facilities, including those that are the property of a third party, resulting from failure to comply with the requirements of this contract or failure to exercise reasonable care in performing the work. If the Contractor fails or refuses to repair the damage promptly, the Contracting Officer may have the necessary work performed and charge the cost to the Contractor.

52.242-14 SUSPENSION OF WORK (APR 1984)

(a) The Contracting Officer may order the Contractor, in writing, to suspend, delay, or interrupt all or any part of the work of this contract for the period of time that the Contracting Officer determines appropriate for the convenience of the Government.

(b) If the performance of all or any part of the work is, for an unreasonable period of time, suspended, delayed, or interrupted (1) by an act of the Contracting Officer in the administration of this contract, or (2) by the Contracting Officer's failure to act within the time specified in this contract (or within a reasonable time if not specified), an adjustment shall be made for any increase in the cost of performance of this contract (excluding profit) necessarily caused by the unreasonable suspension, delay, or interruption, and the contract modified in writing accordingly. However, no adjustment shall be made under this clause for any suspension, delay, or interruption to the extent that performance would have been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the Contractor, or for which an equitable adjustment is provided for or excluded under any other term or condition of this contract. (c) A claim under this clause shall not be allowed (1) for any costs incurred more than 20 days before the Contractor shall have notified the Contracting Officer in writing of the act or failure to act involved (but this requirement shall not apply as to a claim resulting from a suspension order), and (2) unless the claim, in an amount stated, is asserted in writing as soon as practicable after the termination of the suspension, delay, or interruption, but not later than the date of final payment under the contract.

52.249-10 DEFAULT (FIXED-PRICE CONSTRUCTION) (APR 1984)

(a) If the Contractor refuses or fails to prosecute the work or any separable part, with the diligence that will insure its completion within the time specified in this contract including any extension, or fails to complete the work within this time, the Government may, by written notice to the Contractor, terminate the right to proceed with the work (or the separable part of the work) that has been delayed. In this event, the Government may take over the work and complete it by contract or otherwise, and may take possession of and use any materials, appliances, and plant on the work site necessary for completing the work. The Contractor and its sureties shall be liable for any damage to the Government resulting from the Contractor's refusal or failure to complete the work within the specified time, whether or not the Contractor's right to proceed with the work is terminated. This liability includes any increased costs incurred by the Government in completing the work.

(b) The Contractor's right to proceed shall not be terminated nor the Contractor charged with damages under this clause, if--

(1) The delay in completing the work arises from unforeseeable causes beyond the control and without the fault or negligence of the Contractor. Examples of such causes include

(i) acts of God or of the public enemy,

(ii) acts of the Government in either its sovereign or contractual capacity,

(iii) acts of another Contractor in the performance of a contract with the Government,

(iv) fires,

(v) floods,

(vi) epidemics,

(vii) quarantine restrictions,

(viii) strikes,

(ix) freight embargoes,

(x) unusually severe weather, or delays of subcontractors or suppliers at any tier arising from unforeseeable causes beyond the control and without the fault or negligence of both the Contractor and the subcontractors or suppliers; and

(2) The Contractor, within 10 days from the beginning of any delay (unless extended by the Contracting Officer), notifies the Contracting Officer in writing of the causes of delay. The Contracting Officer shall ascertain the facts and the extent of delay. If, in the judgment of the Contracting Officer, the findings of fact warrant such action, the time for completing the work shall be extended. The findings of the Contracting Officer shall be final and conclusive on the parties, but subject to appeal under the Disputes clause.

(c) If, after termination of the Contractor's right to proceed, it is determined that the Contractor was not in default, or that the delay was excusable, the rights and obligations of the parties will be the same as if the termination had been issued for the convenience of the Government.

The rights and remedies of the Government in this clause are in addition to any other rights and remedies provided by law or under this contract.

52.252-2 CLAUSES INCORPORATED BY REFERENCE (FEB 1998)

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at this/these address(es):

http://www.arnet.gov.far
http://www.acq.osd.mil/dp/dars/dfars/htm1

SECTION 00800 Special Contract Requirements

CLAUSES INCORPORATED BY REFERENCE:

52.211-10	Commencement, Prosecution, and Completion of Work	APR 1984
52.211-12	Liquidated Damages--Construction	SEP 2000
52.223-14	Toxic Chemical Release Reporting	OCT 2000
52.236-5	Material and Workmanship	APR 1984
52.246-12	Inspection of Construction	AUG 1996
252.225-7014	Preference For Domestic Specialty Metals	MAR 1998
252.225-7030	Restriction On Acquisition Of Carbon, Alloy, And Armor Steel Plate	OCT 1992

CLAUSES INCORPORATED BY FULL TEXT

52.231-5000 EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE MAR 1995)--EFARS

(a) This clause does not apply to terminations. See 52.249-5000, Basis for Settlement of Proposals and FAR Part 49.

(b) Allowable cost for construction and marine plant and equipment in sound workable condition owned or controlled and furnished by a contractor or subcontractor at any tier shall be based on actual cost data for each piece of equipment or groups of similar serial and series for which the Government can determine both ownership and operating costs from the contractor's accounting records. When both ownership and operating costs cannot be determined for any piece of equipment or groups of similar serial or series equipment from the contractor's accounting records, costs for that equipment shall be based upon the applicable provisions of EP 1110-1-8, Construction Equipment Ownership and Operating Expense Schedule, Region ____. Working conditions shall be considered to be average for determining equipment rates using the schedule unless specified otherwise by the contracting officer. For equipment not included in the schedule, rates for comparable pieces of equipment may be used or a rate may be developed using the formula provided in the schedule. For forward pricing, the schedule in effect at the time of negotiations shall apply. For retroactive pricing, the schedule in effect at the time the work was performed shall apply.

(c) Equipment rental costs are allowable, subject to the provisions of FAR 31.105(d)(ii) and FAR 31.205-36. Rates for equipment rented from an organization under common control, lease-purchase arrangements, and sale-leaseback arrangements, will be determined using the schedule, except that actual rates will be used for equipment leased from an organization under common control that has an established practice of leasing the same or similar equipment to unaffiliated lessees.

(d) When actual equipment costs are proposed and the total amount of the pricing action exceeds the small purchase threshold, the contracting officer shall request the contractor to submit either certified cost or pricing data, or partial/limited data, as appropriate. The data shall be submitted on Standard Form 1411, Contract Pricing Proposal Cover Sheet.

(End of clause)

52.232-5000 PAYMENT FOR MATERIALS DELIVERED OFF-SITE (MAR 1995)--EFARS

(a) Pursuant to FAR clause 52.232-5, Payments Under Fixed Priced Construction Contracts, materials delivered to the contractor at locations other than the site of the work may be taken into consideration in making payments if included in payment estimates and if all the conditions of the General Provisions are fulfilled. Payment for items

delivered to locations other than the work site will be limited to: (1) materials required by the technical provisions; or (3) materials that have been fabricated to the point where they are identifiable to an item of work required under this contract.

(b) Such payment will be made only after receipt of paid or receipted invoices or invoices with canceled check showing title to the items in the prime contractor and including the value of material and labor incorporated into the item. In addition to petroleum products, payment for materials delivered off-site is limited to the following items:

_____

(End of clause)

52.243-4 CHANGES (AUG 1987)

(a) The Contracting Officer may, at any time, without notice to the sureties, if any, by written order designated or indicated to be a change order, make changes in the work within the general scope of the contract, including changes --

(1) In the specifications (including drawings and designs);

(2) In the method or manner of performance of the work;

(3) In the Government-furnished facilities, equipment, materials, services, or site; or

(4) Directing acceleration in the performance of the work.

(b) Any other written or oral order (which, as used in this paragraph (b), includes direction, instruction, interpretation, or determination) from the Contracting Officer that causes a change shall be treated as a change order under this clause; provided, that the Contractor gives the Contracting Officer written notice stating

(1) the date, circumstances, and source of the order and

(2) that the Contractor regards the order as a change order.

(c) Except as provided in this clause, no order, statement, or conduct of the Contracting Officer shall be treated as a change under this clause or entitle the Contractor to an equitable adjustment.

(d) If any change under this clause causes an increase or decrease in the Contractor's cost of, or the time required for, the performance of any part of the work under this contract, whether or not changed by any such order, the Contracting Officer shall make an equitable adjustment and modify the contract in writing. However, except for an adjustment based on defective specifications, no adjustment for any change under paragraph (b) of this clause shall be made for any costs incurred more than 20 days before the Contractor gives written notice as required. In the case of defective specifications for which the Government is responsible, the equitable adjustment shall include any increased cost reasonably incurred by the Contractor in attempting to comply with the defective specifications.

(e) The Contractor must assert its right to an adjustment under this clause within 30 days after

(1) receipt of a written change order under paragraph (a) of this clause or (2) the furnishing of a written notice under paragraph (b) of this clause, by submitting to the Contracting Officer a written statement describing the general nature and amount of the proposal, unless this period is extended by the Government. The statement of proposal for adjustment may be included in the notice under paragraph (b) above.

(f) No proposal by the Contractor for an equitable adjustment shall be allowed if asserted after final payment under this contract.

52.244-6 SUBCONTRACTS FOR COMMERCIAL ITEMS (DEC 2001)

(a) Definitions. As used this clause--

"Commercial item", has the meaning contained in the clause at 52.202-1, Definitions.

"Subcontract", includes a transfer of commercial items between divisions, subsidiaries, or affiliates of the Contractor or subcontractor at any tier.

(b) To the maximum extent practicable, the Contractor shall incorporate, and require its subcontractors at all tiers to incorporate, commercial items or nondevelopmental items as components of items to be supplied under this contract.

(c)(1) The Contractor shall insert the following clauses in subcontracts for commercial items:

(i) 52.219-8, Utilization of Small Business Concerns (OCT 2000) (15 U.S.C. 637(d)(2) and (3)), in all subcontracts that offer further subcontracting opportunities. If the subcontract (except subcontracts to small business concerns) exceeds $500,000 ($1,000,000 for construction of any public facility), the subcontractor must include 52.219-8 in lower tier subcontracts that offer subcontracting opportunities.

(ii) 52.222-26, Equal Opportunity (FEB 1999) (E.O. 11246).

(iii) 52.222-35, Equal Opportunity for Special Disabled Veterans, Veterans of the Vietnam Era and Other Eligible Veterans (DEC 2001) (38 U.S.C. 4212(a)).

(iv) 52.222-36, Affirmative Action for Workers with Disabilities (JUN 1998) (29 U.S.C. 793).

(v) 52.247-64, Preference for Privately Owned U.S.-Flagged Commercial Vessels (JUN 2000) (46 U.S.C. Appx 1241) (flowdown not required for subcontracts awarded beginning May 1, 1996).

(2) While not required, the Contractor may flow down to subcontracts for commercial items a minimal number of additional clauses necessary to satisfy its contractual obligations.

(d) The Contractor shall include the terms of this clause, including this paragraph (d), in subcontracts awarded under this contract.

52.246-21 WARRANTY OF CONSTRUCTION (MAR 1994)

(a) In addition to any other warranties in this contract, the Contractor warrants, except as provided in paragraph (i) of this clause, that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, or design furnished, or workmanship performed by the Contractor or any subcontractor or supplier at any tier.

(b) This warranty shall continue for a period of 1 year from the date of final acceptance of the work. If the Government takes possession of any part of the work before final acceptance, this warranty shall continue for a period of 1 year from the date the Government takes possession.

(c) The Contractor shall remedy at the Contractor's expense any failure to conform, or any defect. In addition, the Contractor shall remedy at the Contractor's expense any damage to Government-owned or controlled real or personal property, when that damage is the result of--

(1) The Contractor's failure to conform to contract requirements; or

(2) Any defect of equipment, material, workmanship, or design furnished.

(d) The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for 1 year from the date of repair or replacement.

(e) The Contracting Officer shall notify the Contractor, in writing, within a reasonable time after the discovery of any failure, defect, or damage.

(f) If the Contractor fails to remedy any failure, defect, or damage within a reasonable time after receipt of notice, the Government shall have the right to replace, repair, or otherwise remedy the failure, defect, or damage at the Contractor's expense.
(g) With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall--

(1) Obtain all warranties that would be given in normal commercial practice;

(2) Require all warranties to be executed, in writing, for the benefit of the Government, if directed by the Contracting Officer; and

(3) Enforce all warranties for the benefit of the Government, if directed by the Contracting Officer.

(h) In the event the Contractor's warranty under paragraph (b) of this clause has expired, the Government may bring suit at its expense to enforce a subcontractor's, manufacturer's, or supplier's warranty.

(i) Unless a defect is caused by the negligence of the Contractor or subcontractor or supplier at any tier, the Contractor shall not be liable for the repair of any defects of material or design furnished by the Government nor for the repair of any damage that results from any defect in Government-furnished material or design.

(j) This warranty shall not limit the Government's rights under the Inspection and Acceptance clause of this contract with respect to latent defects, gross mistakes, or fraud.

(End of clause)

252.236-7001 CONTRACT DRAWINGS, MAPS, AND SPECIFICATIONS (AUG 2000)

(a) The Government will provide to the Contractor, without charge, one set of contract drawings and specifications, except publications incorporated into the technical provisions by reference, in electronic or paper media as chosen by the Contracting Officer.

(b) The Contractor shall--

(1) Check all drawings furnished immediately upon receipt;

(2) Compare all drawings and verify the figures before laying out the work;

(3) Promptly notify the Contracting Officer of any discrepancies;

(4) Be responsible for any errors that might have been avoided by complying with this paragraph (b); and

(5) Reproduce and print contract drawings and specifications as needed.

(c) In general--

(1) Large-scale drawings shall govern small-scale drawings; and

(2) The Contractor shall follow figures marked on drawings in preference to scale measurements.

(d) Omissions from the drawings or specifications or the misdescription of details of work that are manifestly necessary to carry out the intent of the drawings and specifications, or that are customarily performed, shall not relieve the Contractor from performing such omitted or misdescribed details of the work. The Contractor shall perform such details as if fully and correctly set forth and described in the drawings and specifications.

(e) The work shall conform to the specifications and the contract drawings identified on the following index of drawings:

Title	File	Drawing No.
Cover	Sh-01.pdf.	01
Location and Vicinity	Sh-02.pdf.	02
Site Plan	Sh-03.pdf	03
Embankment Plan/Profile	Sh-04.pdf	04
Embankment Plan/Profile	Sh-05.pdf	05
Embankment Plan/Profile	Sh-06.pdf	06
Embankment Plan/Profile	Sh-07.pdf	07
Embankment Plan/Profile	Sh-08.pdf	08
Designated Borrow Area Topsoil Stockpile	Sh-09.pdf	09
Emergency Spillway Plan/Profile	Sh-10pdf	10
Inlet Channel Profile	Sh-11.pdf	11
Outlet Works Plan	Sh-12.pdf	12
CrossSection A-A	Sh-13.pdf	13
Typical Embankment Cross-Section	Sh-14.pdf	14
Details	Sh-15.pdf	15
Details	Sh-16.pdf	16
Details	Sh-17.pdf	17

(End of clause)

SECTION 00810

Wage Rates
02

1.1 [Enter Appropriate Subpart Title Here]

GENERAL DECISION KS000064 03/02/01 KS64
General Decision Number KS010064

Superseded General Decision No. KS000064

State: Kansas

Construction Type:
HEAVY

County(ies):

ANDERSON	ELK	MORRIS
ATCHISON	FRANKLIN	NEMAHA
BROWN	GREENWOOD	OSAGE
CHASE	HARPER	OTTAWA
CHAUTAUQUA	JACKSON	POTTAWATOMIE
CLAY	KINGMAN	RENO
CLOUD	LINN	REPUBLIC
COFFEY	LYON	SALINE
COWLEY	MARION	SUMNER
DICKINSON	MARSHALL	WABAUNSEE
DONIPHAN	MCPHERSON	WASHINGTON

HEAVY CONSTRUCTION PROJECTS (does not include Sewer & Water Line Construction Projects)

Modification Number	Publication Date
0	03/02/2001

COUNTY(ies):

ANDERSON	ELK	MORRIS
ATCHISON	FRANKLIN	NEMAHA
BROWN	GREENWOOD	OSAGE
CHASE	HARPER	OTTAWA
CHAUTAUQUA	JACKSON	POTTAWATOMIE
CLAY	KINGMAN	RENO
CLOUD	LINN	REPUBLIC
COFFEY	LYON	SALINE
COWLEY	MARION	SUMNER
DICKINSON	MARSHALL	WABAUNSEE
DONIPHAN	MCPHERSON	WASHINGTON

SUKS2009A 05/12/1994

	Rates	Fringes
AIR TOOL OPERATOR (OVER 65LBS)	6.75	
ASPHALT PAVER SCREED OPERATOR	8.50	
ASPHALT PAVING MACHINE OPERATOR	9.18	
ASPHALT PLANT OPERATOR	9.50	
ASPHALT RAKER	7.33	
AUTOGRADER OPERATOR	10.70	
BACKHOE OPERATOR	8.85	
BATCHING PLANT SCALEMAN	6.75	
BLOWING MECHANISM OR MULCH SEEDER OPERATOR	6.67	
BULLDOZER OPERATOR (PUSH CAT)	8.73	
CARPENTER	9.35	
CARPENTER (ROUGH)	8.50	
CONCRETE CENTRAL MIX PLANT	9.50	
CONCRETE FINISHER	10.21	
CONCRETE FINISHER MACHINE OPERATOR	9.42	
CONCRETE SAW OPERATOR	7.99	
CRANE OR ANY MACHINE POWER SWING	10.00	
CRUSHER AND SCREENING PLANT OPERATOR	10.35	
DISTRIBUTOR OPERATOR	8.11	
DRILLING RIG OPERATOR	8.13	
ELECTRICIAN	13.00	
EXCAVATOR OPERATOR	10.00	
FORM LINE AND SETTER	7.40	
FRONT END LOADED OPERATOR	9.17	
GROUNDMAN	6.75	
LABORER (CONSTRUCTION)	6.75	
MATERIAL TRANSFER VEHICLE OPERATOR	7.93	
MECHANIC	10.50	
MIXER, CONCRETE PORTABLE	8.63	
MOTOR, GRADER OPERATOR (FINISH)	9.40	
MOTOR, GRADER OPERATOR (ROUGH)	8.60	
MOTOR, SCRAPER OPERATOR	8.05	
PAINTERS (STRUCTURAL STEEL & BRIDGE)	10.60	
PAVEMENT BREAKER TAMPER OPERATOR (SELF-PROPELLED)	9.00	
PAVING EQUIPMENT OPERATOR	9.55	

POST DRIVER AND/OR AUGER OPERATOR	8.64
REINFORCING STEEL SETTER	8.42
ROLLER/COMPACTOR OPERATOR (SELF-PROPELLED)	8.47
ROTARY BROOM OPERATOR	7.25
ROTOR MILL OPERATOR	8.58
SANDBLASTER (STRUCTURAL STEEL & BRIDGE)	8.00
SERVICEMAN (EQUIPMENT)	9.15
SHOULDER MACHINE OPERATOR	8.45
SPREADER BOX OPERATOR (SELF-PROPELLED)	9.22
SKIDSTEER LOADER OPERATOR	7.65
STEEL WORKER (STRUCTURAL)	8.42
TRACTOR OPERATOR (80 HP OR LESS)	7.11
TRACTOR OPERATOR (80 HP OR MORE)	7.56
TRUCK DRIVER (SINGLE AXLE)	7.50
TRUCK DRIVER (TANDEM AXLE)	7.52
TRUCK DRIVER (TRIPLE AXLE AND SEMI)	8.28
WELDER	8.79

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR 5.5(a)(1)(v)).

In the listing above, the "SU" designation means that rates listed under that identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U. S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U. S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

4.) All decisions by the Administrative Review Board are final.

END OF GENERAL DECISION

DACW41-02-0005

-- End of Section --

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-- End of Project Table of Contents --

SECTION 01100

GENERAL

PART 1 GENERAL

1.1 INQUIRIES

Pursuant to SECTION 00100 paragraph titled**"Explanation to Prospective Bidders"**, any inquiries regarding this Invitation, before bids are opened, should be addressed to the District Engineer, Kansas City District, Corps of Engineers, 700 Federal Building, Kansas City, Missouri 64106, ATTN: **Ms. Valerie Hanse**. Inquiries for which oral explanation or advice on the plans and specifications will suffice may be referred to **Ms. Hanse** by calling Area Code 816-983-**3143**. Telephone calls concerning the mailing of plans and specifications should be made to Contracting Division at Area Code 816-983-3975. Collect telephone calls will not be accepted. (KCDO APR 84)

1.2 SUPERINTENDENCE OF SUBCONTRACTORS

(a) The Contractor shall be required to furnish the following:

(1) If more than 50% and less than 70% of the value of the contract work is subcontracted, one superintendent shall be provided at the site and on the Contractor's payroll to be responsible for coordinating, directing, inspecting and expediting the subcontract work.

(2) If 70% or more of the value of the work is subcontracted, the Contractor shall be required to furnish two such superintendents to be responsible for coordinating, directing, inspecting and expediting the subcontract work.

(b) If the Contracting Officer, at any time after 50% of the subcontracted work has been completed, finds that satisfactory progress is being made, he may waive all or part of the above requirement for additional superintendence subject to the right of the Contracting Officer to reinstate such requirement if at any time during the progress of the remaining work he finds that satisfactory progress is not being made.

1.3 IDENTIFICATION OF EMPLOYEES

The Contractor shall be responsible for furnishing to each employee and for requiring each employee engaged on the work to display identification as may be approved and directed by the Contracting Office. All prescribed identification shall immediately be delivered to the Contracting Officer, for cancellation upon the release of any employee. When required by the Contracting Officer the Contractor shall obtain and submit fingerprints of all persons employed or to be employed on the project.

1.4 APPLICATION OF WAGE RATES

The inclusion of the Davis-Bacon Act General Wage Decision or the Service Contract Act Wage Determination in the solicitation is a statutory requirement. It is not a representation by the U.S. Army Corps of Engineers that any specific work task can be performed by any specific trade. Which work tasks can be performed by what trades depends on and is determined by the prevailing area practice for the local area where the contract is being performed. It is the sole responsibility of the **bidder** to determine and comply with the prevailing area practice. Inquiries regarding a prevailing area practice should be directed to the Corps of Engineers, Contractor Industrial Relations Specialist (telephone number 816-983-3723) or to the Department of Labor Regional Wage and Hour Division.

Alt #1 (Heavy)

Application of wage rates and fringe benefits: For the application of the wage rates and fringe benefits contained in the Decision of the Secretary of Labor; attached to and a part of this contract, all work shall be considered (Heavy Construction) (Building Construction) (Highway Construction) (Residential.)

1.5 PAYMENTS TO SUBCONTRACTORS

The Contractor's attention is directed to CONTRACT CLAUSE titled "Payment Under Fixed-Price Construction Contracts." In addition to the requirements set forth in the referenced paragraph, the Government will reimburse the Contractor, upon request, for amount of premiums paid by the subcontractors for performance and payment bonds (including coinsurance and reinsurance agreements, when applicable) after the Contractor furnishes evidence of full payment to the surety.

1.6 PAYMENTS TO CONTRACTOR (KCD MAY 90 - FORMERLY FAR 52.2/9101(a))

The following is an example of a Contractor's release of claims clauses required to comply with the provisions of paragraph (h) of the CONTRACT CLAUSE titled "Payments Under Fixed-Price Construction Contracts":

RELEASE OF CLAIMS

The undersigned Contractor under contract dated _____, 2000, between the United States of America and said Contractor for the _____ located at _____, in accordance with paragraph (h) of the CONTRACT CLAUSE titled "Payments Under Fixed-Price Construction Contracts" of said contract, hereby releases the United States, its officers, agents, and employees from any and all claims arising under or by virtue of said contract or any modification or change thereof except with respect to those claims, if any, listed below:

(Here itemize claims and amounts due.)

SPEC WRITER: Use the following only if recommended by Construction Division

1.7 PARTNERING

The Government intends to encourage the foundation of a cohesive partnership with the Contractor and its subcontractor. This partnership will be structured to draw on the strengths of each organization to identify and achieve mutual goals with the intent to complete the Contract within budget, on schedule and in accordance with plans and specifications. This partnership will be bilateral in makeup, and participation will be totally voluntary. Any cost associated with implementing this partnership will be agreed to by the Contractor and the Government, and will be shared equally with no change in Contract price. To implement this partnership initiative, it is anticipated that thirty (30) days after Notice to Proceed, a team building workshop will be conducted. Follow-up workshops will be held periodically throughout the duration of the Contract as agreed to by the Contractor and the Government.

1.8 PROSPECTIVE CONTRACTOR RESPONSIBILITY

Each bidder shall furnish, within 3 calendar days after receipt of request therefor, data which will show the bidder's ability to perform the work or services required by this Invitation for Bids. Such data shall include as a minimum: Bank certification of financial capability, or a financial statement not over 60 days old, which will be treated as confidential (if over 60 days old, a certificate shall be attached thereto stating that the financial condition is substantially the same or, if not the same, the changes that have taken place); names of commercial and financial reporting agencies from whom credit reports may be obtained; trade creditors; name and address of bonding company; business and construction experience; past record of performance of Government contracts; and construction plant and equipment available for this job, with resume of work in progress or other data that will assure that the bidder is in a position to perform the work within the time specified. There shall also be furnished any other available information which will serve to substantiate the bidder's qualifications as a responsible prospective Contractor. (KCD APR 84)

1.9 PERFORMANCE OF WORK BY CONTRACTOR

Bidder's attention is directed to SPECIAL CLAUSE titled "Performance of Work by Contractor." The successful bidder will be required to furnish the Contracting Officer, a description of the work which he will perform with his own organization (e.g., earthwork, paving, etc.), the percentage of the total work this represents, and the estimated cost thereof. Such description of work to be performed by the Contractor's own organization shall be furnished to the Contracting Officer within 10 days after award of the contract.

1.10 LABORATORY AND TESTING FACILITIES

The Contractor shall provide and maintain all measuring and testing devices, laboratory equipment, instruments, transportation, and supplies necessary to accomplish the required testing. All measuring and testing devices shall be calibrated at established intervals against certified standards. The Contractor's measuring and testing equipment shall be made available for use by the Government for verification of their accuracy and condition as well as for any inspection or test desired pursuant to the CONTRACT CLAUSE titled "Inspection of Construction." The location of the laboratory shall be convenient to the site such that test results are available prior to proceeding with the next sequential phase of the work. (KCD)

1.11 LIMITS OF RIGHT-OF-WAY

Limits of right-of-way within private property shall be established as soon as practicable and at least 30 days prior to commencing work in the immediate vicinity, to allow time for relocation of fences by owners of property adjacent to the location of the work.

1.12 UNAVAILABILITY OF UTILITIES

The responsibility shall be upon the Contractor to provide and maintain at his own expense, adequate utilities for his use for construction and domestic consumption, and to install and maintain necessary connections and lines for same, but only at such locations and in such manner as may be approved by the Contracting Officer. Before final acceptance, temporary connections and lines installed by the Contractor shall be removed in a manner satisfactory to the Contracting Officer.

1.13 TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER

(a) This provision specifies the procedure for determination of time extensions for unusually severe weather in accordance with the CONTRACT CLAUSE titled "Default: (Fixed Price Construction)." In order for the Contracting Officer to award a time extension under this clause, the following conditions must be satisfied:

(1) The weather experienced at the project site during the contract period must be found to be unusually severe, that is, more severe than the adverse weather anticipated for the project location during any given month.

(2) The unusually severe weather must actually cause a delay to the completion of the project. The delay must be beyond the control and without the fault or negligence of the Contractor.

(b) The following schedule of monthly anticipated adverse weather delays is based on National Oceanic and Atmospheric Administration (NOAA) or similar data for the project location and will constitute the base line for monthly weather time evaluations. The Contractor's progress schedule must reflect these anticipated adverse weather delays in all weather dependent activities.

MONTHLY ANTICIPATED ADVERSE WEATHER DELAY

WORK DAYS BASED ON (5) DAY WORK WEEK

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(16)	(11)	(6)	(7)	(7)	(8)	(7)	(5)	(6)	(5)	(3)	(9)

(c) Upon acknowledgment of the Notice to Proceed (NTP) and continuing throughout the contract, the Contractor will record on the daily CQC report, the occurrence of adverse weather and resultant impact to

normally scheduled work. Actual adverse weather delay days must prevent work on critical activities for 50 percent or more of the Contractor's scheduled work day. The number of actual adverse weather delay days shall include days impacted by actual adverse weather (even if adverse weather occurred in previous month), be calculated chronologically from the first to the last day of each month, and be recorded as full days. If the number of actual adverse weather delay days exceeds the number of days anticipated in paragraph b, above, the Contracting Officer will convert any qualifying delays to calendar days, giving full consideration for equivalent fair weather work days, and issue a modification in accordance with the CONTRACT CLAUSE titled "Default (Fixed Price Construction)." (ER 415-1-15)

1.14 REQUIRED INSURANCE SCHEDULE

In accordance with CONTRACT CLAUSE titled "Insurance - Work On A Government Installation," the Contractor shall procure and maintain during the entire period of his performance under this contract the following minimum insurance.

Type	Amount
Workmen's Compensation State Statute	coverage complying with applicable
Employers' Liability	minimum amount of $100,000.00
General Liability on Comprehensive Form of Policy which includes, but is not limited to, insurance for all work required herein	minimum limits of $500,000 per occurrence for bodily injury
Comprehensive Automobile Liability	minimum limits of $200,000 per person and $500,000 per occurrence for bodily injury, and $20,000 per occurrence for property damage

(End of clause)

Alt #2

1.15 INTERRUPTIONS TO UTILITY SERVICES

A schedule showing the approximate times of interruptions of utility services and roads shall be submitted approximately 30 days in advance of interrupting services to make connections. Where it is necessary to interrupt services to make connections and the period of interruption will last more than 2 hours, the connections shall be performed on Saturday or Sunday, unless otherwise approved by the Contracting Officer. Final arrangements shall be made with the Contracting Officer at least 72 hours in advance of the scheduled times of interruptions.

1.16 COORDINATION BETWEEN CONTRACTORS

(See CONTRACT CLAUSE titled "Other Contracts.") Construction work on another contract is underway concurrently with this Contract. The obligations of the Contractor under this Contract will include jointly planning and scheduling the work, on a cooperative basis, with the other Contractor involved in order to minimize delays and interferences. Alterations to systems installed under the other contract, including connections to sewer, waterlines, and bituminous pavement shown as existing, may not be in place.

1.17 EQUIPMENT OWNERSHIP EXPENSE SCHEDULE

Allowable ownership expense for construction plant and equipment in sound workable condition owned and furnished by the Contractor for work requiring adjustments in the contract price shall be based on the "Contractor's Equipment Ownership Expense Schedule," Sixth Edition, 1966, published by the Associated General Contractors of America, Inc., except that (1) the average use per year shall be 8 months, and (2) the depreciation schedules for straight line method utilizing the useful life periods listed below:

Item of Plant	Depreciation Period in Years (See Note)
Hydraulic Dredge, including Hydraulic Dredges used as Boosters	30
Bucket Dredge	30
Barges	
Fuel	20
Water	20
Equipment of Work	20
Derrick	20
Anchor	20
Booster and Barge	20
Drill Boat or Barge	20
Mooring Barge	20
Tugs	20
Tenders	20
Launches	12
Shore Pipeline	3
Floating Line	
Pontoons	15
Pipeline and Joints	10

NOTE 1: To arrive at annual rate of depreciation in percentage, divide total years of depreciation into 100 percent.

NOTE 2: The AGC provision for an additional charge of 50 percent of the single shift rate for each

additional shift of 8 hours is applicable only to the percentage stated in the column of the AGC manual entitled, "Overhauling, Major Repairs, Painting."

1.18 CONTRACTOR-FURNISHED EQUIPMENT DATA

At or before 30 days prior to final inspection and acceptance of the work, the Contractor shall submit the data mentioned in the following subclauses.

(1) Equipment List. An itemized equipment list showing unit retail value and nameplate data including serial number, model number, size, manufacturer, etc., for all Contractor-furnished items of mechanical equipment, electrical equipment, and fire protection systems installed under this contract.

(2) Guarantees. A list of all equipment items which are specified to be guaranteed accompanied by a copy of each specific guarantee therefor. For each specific guaranteed item, a name, address, and telephone number shall be shown on the list for subcontractor who installed equipment, equipment supplier or distributor and equipment manufacturer. The completion date of the guarantee period shall correspond to the applicable specification requirements for each guaranteed item.

(3) Warranty Service Calls. The Contractor shall furnish to the Contracting Officer the names of local service representatives and/or Contractors that are available for warranty service calls and who will respond to a call within the time periods as follows: 4 hours for heating, air-conditioning, refrigeration, air supply and distribution, and critical electrical service systems and food service equipment, and 24 hours for all other systems. The names, addresses, and telephone numbers for day, night, weekend, and holiday service responses shall be furnished to the Contracting Officer and also posted at a conspicuous location in each mechanical and electrical room or close to the unit.

1.19 PROGRESS PAYMENTS

Progress payments made pursuant to the CONTRACT CLAUSE titled "Payments Under Fixed-Price Construction Contracts" for any item of work in the bid schedule shall be based on the contract unit price or lump sum amount set forth in the bid schedule for that item of work. If the amount of the unit price or lump sum bid for any item of work is in excess of 125% of the Government estimate for such item, the Contracting Officer may require the Contractor to produce cost data to justify the price of the bid item. Failure to justify the bid item price to the satisfaction of the Contracting Officer may result in payment of an amount equal to 125% of the Government estimate for such bid item upon completion of work on the item and payment of the remainder of the bid item price upon final acceptance of all contract work. (KCDO NOV 88)

1.20 DATE OF SAFETY AND HEALTH REQUIREMENTS MANUAL (EM 385-1-1)

(a) The date of the U.S. Army Corps of Engineers Safety and Health Requirements Manual in effect on the date of this solicitation is
3 September 1996. See Section 00700, Contract Clause titled "Accident Prevention."

(b) Section 06.I of EM 385-1-1 is deleted. Job hazard analysis for confined space entry procedures is still required, as per 01.A.09 of
EM 385-1-1. OSHA Standards 29 CFR 1910.146 or 29 CFR 1926 shall apply.

(c) Before initiation of work at the job site, an accident prevention plan, written by the prime contractor for the specific work and hazards of the contract and implementing in detail the pertinent requirements of EM 385-1-1, will be reviewed and found acceptable by designated Government personnel.

1.21 COMPLIANCE WITH OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA)

The Contractor shall comply with OSHA standards as well as the most current edition of the Corps of Engineers General Safety Requirements Manual (EM 385-1-1). The OSHA standards are subject to change and such changes may affect the Contractor in his performance under the contract. It is the Contractor's responsibility to know such changes and effective dates of changes.

1.22 CONSTRUCTION EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE

Whenever a modification or equitable adjustment of contract price is required, the Contractor's cost proposal for equipment ownership and operating expenses shall be as set forth in SPECIAL CLAUSE titled "Equipment Ownership and Operating Expense Schedule." A copy of EP 1110-1-8 "Construction Equipment Ownership and Operating Expense Schedule" dated August 1995 can be ordered from the Government Printing Office (GPO) by calling Telephone No. 202-512-1800.

1.23 SHOP DRAWINGS

The Contractor's attention is directed to clause "Specifications and Drawings for Construction" of the Contract Clauses.

1.24 SUBMITTALS

(a) Submittal Procedures. See Division One SECTION: SUBMITTAL PROCEDURES.

(b) Shop Drawings shall be submitted in ample time to secure approval prior to the time the items covered thereby are to be delivered to the site. ENG Form 4025 and 4026 shall be used for the transmittal of shop drawings. Unless otherwise specified, shop drawings shall be submitted not less than 30 days before commencement of fabrication of fabricated items and not less than 15 days before delivery of standard stock manufactured items. Where materials are stock with the manufacturer, catalog data, including specifications and full descriptive matter, may be submitted as shop drawings. When catalog includes nonapplicable data, the applicable data shall be clearly designated and identified by item number, item name, and name of manufacturer. Shop drawings submitted (including initial and final submittals) shall be reproductions on high quality paper with clear and legible print. Drawings shall generally be bordered a minimum of one inch and trimmed to neat lines and unless otherwise specified, the minimum scale shall be 3/8-inch to the foot. Shop drawings quality will be subject to approval. Each shop drawing, including catalog data, shall be identified with a title block including the name of Contractor, contract number, name and location of project, and name of item of work or structure to which the shop drawing applies. Material fabricated or delivered to the site before approved shop drawings have been

returned to the Contractor will be subject to rejection. NO CONSTRUCTION OR INSTALLATION SHALL BE DONE FOR ANY ITEM REQUIRING SHOP DRAWINGS, UNTIL ALL SHOP DRAWINGS FOR THAT ITEM HAVE BEEN APPROVED.

(c) As-Built Shop Drawings: Upon completion of the work under this contract, the Contractor shall furnish five complete sets of prints or one complete set of reproducibles of all shop drawings as finally approved. These drawings shall show all changes and revisions made up to the time the equipment is completed and accepted. The quality of the reproducibles and prints is subject to approval.

(d) As-Built Drawings: The Contractor shall maintain three separate sets of red-lined, full scale, as-built construction drawings marked up to fully indicate as-built conditions. These drawings shall be maintained in a current condition at all times until completion of the work, and shall be available for review by Government personnel at all times. All variations from the contract drawings, for whatever reason, including those occasioned by modifications, optional materials, and the required coordination between trades, shall be indicated. These variations shall be shown in the same general detail utilized in the contract drawings. In addition, the Contractor shall indicate on the As-Built Drawings, the brand-name, description, location, and quantity of any and all materials used which contain asbestos. The Contractor shall also be responsible for updating the Government-furnished CADD files to reflect the current as-built conditions throughout the duration of the project. The updated CADD design files shall be maintained in the Intergraph Microstation format consistent with the graphic standards established in the CADD contract drawings provided by the Government. The Contractor will be provided a copy of the Tri-Service CADD standards to facilitate his efforts in the maintenance of design files. The updated CADD files shall be reviewed by the Government on a monthly basis during the progress payment evaluation. The Contractor shall be prepared to demonstrate the status of the updated CADD files in his on-site office. The as-built utility drawings shall show locations and elevations of all underground new utilities and existing utilities encountered, including dimensions from permanent structures and/or survey locations. The submittal requirements for as-built utility drawings shall be shown as separate activities on the Contractor-prepared network analysis. Upon completion of the work, the marked-up drawings and the updated CADD files shall be furnished to the Contracting Officer on 8 mm tape or CD. In multiphased construction where portions of a system are to be turned over to the user prior to completion of the project, the marked-up drawings for that portion shall be furnished to the Contracting Officer at that time.(MRD ltr 30 Oct 70 and KCD 8 Apr 91)

(e) CADD Files: The Government will provide to the Contractor, within 30 calendar days after Notice of Award, copies of the CADD computer files of the contract drawings for the production of as-built drawings. These files will be in Intergraph Microstation format. The Government provides no warranty, expressed or implied, of the CADD computer files. The Contractor shall assume all responsibility to verify the CADD drawing files. The Contractor will not utilize the CADD drawing computer files to resolve dimensional or other discrepancies. The Government will not guarantee the measurable accuracy of the CADD drawing computer files.

(f) Purchase Orders: Each purchase order issued by the Contractor or his subcontractors for materials and equipment to be incorporated into the project, shall be maintained on file at the Contractor's field office for inspection and review by Government representatives. Each purchase order shall (1) be clearly identified with applicable DA contract number, (2) carry an identifying number, (3) be in sufficient detail to identify the material being purchased, (4) indicate a definite delivery date, and (5) display the DMS priority rating. At the option of the Contractor, the copies of the purchase orders may or may not indicate the price of the articles purchased. (MRD Ltr 22 Oct 74)

1.25 SPECIAL REFERENCES

(a) Shop Drawings. Bidder's attention is directed to SPECIAL CLAUSE titled "Shop Drawings." The basic requirements for Shop Drawings are set forth in the CONTRACT CLAUSES and SPECIAL CLAUSES.

(b) Approved Equal. Bidder's attention is directed to SPECIAL CLAUSE titled "Approved Equal."

(c) Payment to Subcontractors. Bidder's attention is directed to SPECIAL CLAUSE titled "Payments to Subcontractors."

1.26 DIFFERENCES IN DRAWINGS

In addition to the provisions of CONTRACT CLAUSE paragraph "Specifications and Drawings for Construction," the structural drawings shall govern in cases where they differ from the architectural drawings.

1.27 LAYOUT OF WORK (1965 APR OCE)

(a) The Government will establish the following base lines and benchmarks at the site of the work:

(Furnish no more than the following:

Dams - 3 base lines for the dam
- 1 base line for each principal structure
- 1 or 2 bench marks on each bank of stream

Levees and Local

Protection Work - 1 base line at centerline or levee or floodwall
- 1 base line for each principal structure
- bench marks at approximately 1 mile intervals and at each structure

Relocation Projects - alignment survey base lines
- bench marks at wide intervals and at each principal structure

Other Work - as necessary to lay out the work.)

(b) From the base lines and bench marks established by the Government, the Contractor shall complete the layout of the work and shall be responsible for all measurements that may be required for the execution of the work to the location and limit marks prescribed in the specifications or on the contract drawings, subject to such modifications as the Contracting Officer may require to meet changed conditions or as a result of necessary modifications to the contract work.

(c) The Contractor shall furnish, at his own expense, such stakes, templates, platforms, equipment, tools and material, and all labor as may be required in laying out any part of the work from the base lines and benchmarks established by the Government. It shall be the responsibility of the Contractor to maintain and preserve all stakes and other marks established by the Contracting Officer until authorized to remove them, and if such marks are destroyed, by the Contractor or through his negligence prior to their authorized removal they may be replaced by the Contracting Officer, at his discretion, and the expense of replacement will be deducted from any amounts due or to become due the Contractor. The Contracting Officer may require that work be suspended at any time when location and limit marks established by the Contractor are not reasonably adequate to permit checking of the work.

(d) Records of Contractor-performed survey activities shall be kept in complete, accurate, and legible field notes. The format shall conform to established standards for such records. Prior to any surveys, the Contractor shall submit the field note format for approval.

(e) The layout of work shall be under the direction of a competent survey party chief who has the following minimum qualifications: (1) high school graduate; (2) 7 years survey experience; (3) 4 years experience on construction related survey activities, and (4) 1 year experience as survey party chief.

1.28 PLANTS AVAILABLE

Each bidder shall, upon request of the Contracting Officer, furnish a list of the plants available to the bidder and proposed for use on the work.

1.29 QUANTITY SURVEYS USING DRAWING FINISH LINES

Where the TECHNICAL PROVISIONS provide for using the finish lines on drawings as the final lines for quantity measurement purposes, the Contractor shall, in addition to the requirements set forth in SPECIAL CLAUSE paragraph titled "Quantity Surveys", make final surveys at least at all locations (stations) where the Contractor performed original surveys. (KCD 23 Jan 76)

1.30 DAMAGE TO WORK (1966 MAR OCE)

(a) The responsibility for damage to any part of the work to be performed under this contract shall be as set forth in the CONTRACT CLAUSE titled "Permits and Responsibilities." However, if the cofferdam(s) is constructed in accordance with plans and progress schedules approved by the Contracting Officer, but is overtopped by flood and such flood causes damage to the cofferdam or if any part of the permanent work is damaged by flood or earthquake, which damage is not due to the failure of the Contractor to take reasonable precaution or to exercise sound engineering and construction practices in the conduct of the work, the Contractor will make the repairs ordered by the Contracting Officer and full compensation for such repairs will be made at the applicable contract unit or lump sum prices as fixed and established in the contract. If, in the opinion of the Contracting Officer, there are no contract unit or lump sum prices applicable to any part of such damaged work, an equitable adjustment pursuant to Contract Clause entitled, Changes, of the contract, will be made as full compensation therefor.

(b) The Contractor may, subject to approval of the Contracting Officer, [or the Contracting Officer may order the Contractor to] flood or breach the cofferdam during a rise prior to, and in anticipation of, natural flooding due to overtopping. Such flooding or breach will be considered the same as though the cofferdam, if constructed in accordance with plans and progress schedules approved by the Contracting Officer, has been overtopped, in which event an equitable adjustment will be made for damage to the cofferdam and/or any part of the permanent work, as provided in (a) above.

1.31 SIGNAL LIGHTS (JAN 1965)

The Contractor shall display signal lights and conduct his operations in accordance with the General Regulations of the Department of the Army and of the Coast Guard governing lights and day signals to be displayed by towing vessels with tows on which no signals can be displayed, vessels working on wrecks, dredges, and vessels engaged in laying cables or pipe or in submarine or bank protection operations, lights to be displayed on dredge pipelines, and day signals to be displayed by vessels of more than 65 feet in length moored or anchored in a fairway or channel, and the passing by other vessels of floating plant working in navigable channels, as approved by the Secretary of the Army (33 C.F.R. 201.1-201.16) and the Commandant, US Coast Guard (33 C.F.R. 80.18-80.31a and 33 C.F.R. 95.51-95.70). (KCD APR 84)

1.32 PLANT LAYOUT DRAWINGS (1965 APR OCE)

Drawings, in triplicate, showing the layout of the plant the Contractor proposes to use on the work shall be submitted by the Contractor for review by the Contracting Officer. The drawings shall show the locations of the principal components of the construction plant; offices, shop and storage buildings; housing facilities, if any; and storage areas and yards which the Contractor proposes to construct at the site of the work and elsewhere. The Contractor shall also furnish for review by the Contracting Officer drawings, in triplicate, showing the general features of his aggregate processing plant; aggregate transporting, storage and reclaiming facilities; aggregate rinsing and dewatering plant, if required; coarse aggregate rescreening plant, if required; concrete batching and mixing plant; concrete conveying and placing plant; and when precooling of concrete is required, the cooling plant. The drawing shall appropriately show the capacity of each major feature of the plant including the rated capacity of the aggregate production plant in tons per hour of fine and coarse aggregates; rated capacity of the aggregate transporting, storage and reclaiming facilities; volume of aggregate storage; capacity of cement and pozzolan storage; rated capacity of the concrete batching and mixing plant in cubic yards per hour; rated capacity of the concrete transporting and placing plant in cubic yards per hour; and when used rated capacity of plant for precooling of concrete. Drawings in triplicate showing any changes in plant made during design and erection or after the plant is in operation shall be submitted to the

Contracting Officer for review. Two sets of the drawings will be retained by the Contracting Officer and one set will be returned to the Contractor with comments. (ECI 7-671.6)

1.33 AGGREGATE SOURCES (1965 MAY OCE)

(a) Concrete aggregates can be produced from the approved sources listed below:

(1) Sources of fine aggregate: (List the sources in an appropriate manner.)

(2) Sources of coarse aggregate: (List the sources in an appropriate manner.)

(b) Concrete aggregates may be furnished from any of the above listed sources or at the option of the Contractor may be furnished from any other source designated by the Contractor and approved by the Contracting Officer, subject to the conditions hereinafter stated.

(c) After the award of the contract, the Contractor shall designate in writing only one source or combination of sources from which he proposes to furnish aggregates. If the Contractor proposes to furnish aggregate from a source or from sources not listed above, he may designate only a single source or single combination of sources for aggregates. Samples for acceptance testing shall be provided as required by Section: @ of the Technical Provisions. If a source for coarse or fine aggregate so designated by the Contractor is not approved for use by the Contracting Officer, the Contractor may not submit for approval other sources but shall furnish the coarse or fine aggregate, as the case may be, from an approved source listed above at no additional cost to the Government.

(d) Listing of a concrete aggregate source is not to be construed as approval of all material from the source. The right is reserved to reject materials from certain localized areas, zones, strata, or channels when such materials are unsuitable for concrete aggregate as determined by the Contracting Officer. Materials produced from an approved source shall meet all the requirements of Section: of the Technical Provisions of these specifications.

1.34 WORK ADJACENT TO ROADS AND HIGHWAYS

Where the construction work is on or adjacent to, or involves hauling over public or private roads, streets, or highways, all herein referred to as "roads," the said roads shall, except as otherwise specified or directed, be kept open for traffic at all times during the construction period. Further, the Contractor shall, during said construction, provide, erect and maintain warning signs, lanterns or torches or other safety devices and, when necessary, provide flagmen for protection of traffic to the satisfaction of the Contracting Officer and local authorities. The Contractor shall keep the right-of-way of the roads free of debris that might be caused to accumulate thereon by his operations, and upon completion of the work, shall clean up the said roads and repair any damage to the roads occasioned by his operations under this contract to the satisfaction of the Contracting Officer and local authorities having jurisdiction. The drainage from the roads shall not be obstructed by the construction work. The Contractor shall be responsible for obtaining and paying for all permits required for operation on all roads.

1.35 EXISTING ROADS

Where roads under construction follow or tie into existing roads open to traffic, the roads constructed under such conditions shall be open and passable to traffic at all times during construction. Roadbeds shall be maintained to eliminate hazards to traffic, insure a reasonably smooth riding surface, and to provide positive drainage by constant maintenance of sufficient crowns and ditches as construction progresses. During rainy or inclement periods, the roads shall be kept passable by applying adequate surfacing material to the roadbed or by providing a full time attendant to offer assistance to motorists. Upon failure to comply with foregoing requirements, the Contracting Officer reserves the right to direct non-Government sources to correct deficiencies with costs deducted from payment due to the Contractor.

1.36 APPROVED EQUAL

The drawings and the TECHNICAL PROVISIONS of these specifications may, in some instances, refer to certain items of equipment, material, or article by trade name. References of this type shall not be construed as limiting competition, but shall be regarded as establishing a standard of quality. In this respect, the Contractor's attention is directed to CONTRACT CLAUSE titled "Material and Workmanship."

1.37 SCHEDULE OF WORK

The Contractor's attention is directed to CONTRACT CLAUSE titled "Schedule for Construction Contracts," wherein if, in the opinion of the Contracting Officer, the Contractor falls behind the approved schedule, the Contractor shall take steps necessary to improve its progress, including those that may be required by the Contracting Officer.

1.38 PROTECTION OF UTILITY LINES

(a) It shall be the Contractor's responsibility to protect all existing utility lines from damage during excavation for utilities systems. Any damage resulting to existing utility systems shall be repaired by the Contractor, to the satisfaction of the contracting officer, at no additional cost to the Government.

(b) All requests for access and/or locations must be made through the Contracting Officer's Representative (COR) or Resident Engineer. The Director of Public Works will work directly with the Resident Engineer to provide timely information to the Contractor.

1.39 MODIFICATIONS PRIOR TO DATE SET FOR OPENING BIDS

The right is reserved, as the interest of the Government may require, to revise or amend the specifications or drawings or both prior to the date set for opening bids. Such revisions and amendments, if any, will be announced by an amendment or amendments to this Invitation for Bids. If the revisions and amendments are of a nature which requires material changes in quantities or prices bid or

both, the date set for opening bids may be postponed by such number of days as in the opinion of the issuing officer will enable bidders to revise their bids. In such cases, the amendment will include an announcement of the new date for opening bids. (KCD APR 84)

1.40 EXPEDITING NOTICE TO PROCEED

Notwithstanding the requirements of Block 12 on page 00010-1 of SECTION 00010 and SECTION 00100 paragraph titled "Late Submissions, Modifications, and Withdrawals of Bids," in order to expedite award of contract and issuance of NOTICE TO PROCEED, it is requested that an officer of the company or corporation determined to be the successful bidder shall appear in the office of the Commander, Kansas City District, Corps of Engineers, 757 Federal Building, 601 East 12th Street, Kansas City, Missouri, for signing contract documents. Therefore, upon written acceptance of this bid, mailed or otherwise furnished within 60 calendar days after the date of opening of bids, it is requested that the successful bidder shall within 48 hours after receipt of notification appear in the office of the Commander and execute Notice to Proceed documents, and give performance and payment bonds on Government Standard forms 25 and 25A with good and sufficient surety. It is also requested that the successful bidder furnish insurance certificates required in SPECIAL CLAUSE titled "Required Insurance Schedule" at this time.

1.41 UNEXPECTED HAZARDOUS SUBSTANCES

In the event that suspected hazardous substances are revealed during construction activities, all such construction activities in the immediate area shall be immediately suspended. Hazardous substances for purposes of this specification only, shall be defined as CERCLA hazardous substances, infectious or radioactive wastes, asbestos or oil. The Contractor shall leave the materials undisturbed and shall immediately report the find to the Contracting Officer's Representative (COR) so that proper authorities can be notified. The Contractor shall not resume construction activities in the vicinity of the suspected hazardous substances until written clearance is received from the COR. Identification and removal of any such materials will be conducted in accordance with all Federal, state and local environmental laws and regulations according to the CONTRACT CLAUSE titled "Differing Site Conditions."

1.42 IONIZING RADIATION (Notification and Authorization)

a. When USACE controlled radioactive material is used or stored on an active Army or Air Force installation, the appropriate Department of the Army (DA) or Department of the Air Force (DAF) radioactive material authorization must be obtained.

b. Application for DA authorization is submitted through USACE channels to DASEN-SOI on DA Form 3337 (Application For Department Of The Army Radiation Authorization or Permit) executed in accordance with AR 385-11.

c. Application for DAF authorization is submitted to the installation Environmental Health Section (in accordance with AFR 161-16) with a copy furnished to DAEN-SOI.

d. Contractors contemplating the use of radioactive materials or radiation producing equipment on an active DA or DAF installation must obtain the appropriate permit or authorization. A 45 day lead time should be allowed for obtaining a permit (see EM 385-1-1, Sec 6).

(1) DA permit requests should be submitted to the installation commander as described in AR 385-11.

(2) DAF authorization requests should be submitted to the installation Environmental Health Section as described in AFR 161-16.

(3) The Department of the Navy does not have a formal permit or authorization requirement; however, the installation Safety Office should be informed of the intended use.

1.43 KANSAS SALES AND USE TAX

In accordance with FAR clause 52.229-3, notice is given that the contract price excludes the Kansas sales tax and compensating (use) tax on all sales of tangible personal property and materials purchased by the Contractor or subcontractors for the construction of projects, including repairing or remodeling facilities, for the United States. In accordance with Kan. Stats. Anno., sec. 79-3606(e), the Contracting Officer will obtain from the State and furnish to the Contractor an exemption certificate for this project for use by the Contractor and subcontractors in the purchase of materials for incorporation in the project and of services. The Contractor and the subcontractors shall furnish the number of such certificate to all suppliers from whom such purchases are made, and the suppliers shall execute invoices covering the same bearing the number of such certificate. Pursuant to a 1977 Amendment to K.S.A., 1976 Supp., 79-3606(e), effective 1 July 1977, the Contractor is required to retain all invoices for a period of five (5) years during which time these invoices are subject to audit by the Kansas Director of Taxation. Upon completion of the project, the Contractor shall complete the Project Completion Certification (Form STD 77, Rev. 6/77) in duplicate returning one copy to the Contracting Officer, and forwarding the other to the Kansas Director of Taxation. (KCD)

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

* * * * * *

-- End of Section --

SECTION 01270

MEASUREMENT AND PAYMENT
02/94

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Weight Certificates; FIO.

Submit certified weight certificates for R 200 Riprap.

1.2 LUMP SUM PAYMENT ITEMS

Payment items for the work of this contract for which contract lump sum payments will be made are listed in the BIDDING SCHEDULE and described below. All costs for items of work, which are not specifically mentioned to be included in a particular lump sum or unit price payment item, shall be included in the listed lump sum item most closely associated with the work involved. The lump sum price and payment made for each item listed shall constitute full compensation for furnishing all plant, labor, materials, and equipment, and performing any associated Contractor quality control, environmental protection, meeting safety requirements, tests and reports, and for performing all work required for which separate payment is not otherwise provided.

1.2.1 Mobilization and Demobilization

1.2.1.1 Payment

Payment will be made for costs associated with mobilization and demobilization, as defined in Special Clause PAYMENT FOR MOBILIZATION AND DEMOBILIZATION.

1.2.1.2 Unit of Measure

Unit of measure: lump sum.

1.3.2 Contract Bonds

1.3.2.1 Payment

Payment will be made for costs associated with the required contract bonds, as defined previously in this bid document.

1.3.2.2 Unit of Measure

Unit of measure: lump sum.

1.2.2 Outlet Control Structure (Sta 70+77)

1.2.2.1 Payment

Payment will be made for costs associated with operations necessary for construction of the 54" diameter water control structure located at Station 70+77.

1.2.2.2 Unit of Measure

Unit of measure: lump sum.

1.3.4 Clearing and Grubbing

1.2.2.2.# Payment

Payment will be made for clearing, grubbing and stripping at the contract unit price for clearing, grubbing and stripping. This price shall constitute full compensation for all equipment, labor, materials and incidentals necessary to complete the work specified herein. Payment for refilling of holes resulting from grubbing will be included in the contract unit price for clearing, grubbing and stripping. No separate or direct payment will be made for stockpiling and deposition of stripped materials. All costs in connection therewith will be considered as a subsidiary obligation of the Contractor. If regrowth of vegetation or trees occurs after clearing and grubbing and before placement of embankment, and the Contractor is required to clear and grub again prior to embankment construction, no payment will be made for this additional clearing and grubbing.

1.3.4.2 Unit of Measure

Unit of measure: lump sum.

1.3 UNIT PRICE PAYMENT ITEMS

Payment items for the work of this contract on which the contract unit price payments will be made are listed in the BIDDING SCHEDULE and described below. The unit price and payment made for each item listed shall constitute full compensation for furnishing all plant, labor, materials, and equipment, and performing any associated Contractor quality control, environmental protection, meeting safety requirements, tests and reports, and for performing all work required for each of the unit price items.

1.3.1 [Enter Appropriate Subpart Title Here]1.3.1.1 Topsoil Stripping, Stockpiling and Redistribution

1.4.1.1 Payment

Payment will be made for costs associated with topsoil stripping, stockpiling and redistribution at the contract unit price which includes full compensation for equipment, labor, materials, and incidentals necessary to complete the work specified. Payment will be made once for topsoil stripping and stockpiling and once for removal from the stockpile(s) and redistribution to the final graded surface.

1.4.1.2 Measurement

Topsoil stripping and stockpiling shall be measured for payment by surveying cross-sections of the stockpile locations before and after placement of topsoil in the stockpile and calculating the volume, to the nearest whole cubic yard, using the average-end-area method. The volume determined as described above shall be used for payment of topsoil redistribution from the stockpile to the final surface.

1.4.1.3 Unit of Measure

Unit of measure: cubic yard

1.3.2 Excavation

1.3.2.1 Payment

Payment will be made for Excavation at the contract unit price which includes full compensation for all equipment, labor, materials, and incidentals necessary to complete the work specified. No separate payment will be made for stockpiling.

1.3.2.2 Measurement

Measurement shall be based on completed work performed in accordance with the contract drawings and specifications.

1.3.2.3 Unit of Measure

Unit of Measure: cubic yards.

1.3.3 Compacted Fill Material

1.3.3.1 Payment For Embankment Fill

Payment will be made for material placed as required in embankments, backfills and ramps, and including additional material placed by reason of foundation settlement and by reason of soft material in the foundation being forced outward from the section during construction, for Embankment Material Type Compacted Fill. Payment shall constitute full compensation for furnishing all plant, labor, equipment and material, and performing all operations necessary for foundation preparation and placing and compacting the material, materials testing, and moisture control. This payment is in addition to any payment for excavating and transporting of the material as required in paragraph 1.4.2.1, Excavation Payment.

1.3.3.2 Measurement of Fill Material

a. Fill materials specified for embankment will be measured for payment by the cubic yard, and quantities will be determined by the average end area method. The basis for measurement will be cross sections of the areas to be filled taken after clearing, grubbing, and stripping operations and the actual cross sections of the embankments constructed within the specified tolerance plus additional fill placed as the result of displacement or settlement of foundation material. Cross sections shall be performed at significant breaks in grade except that the maximum distance between cross sections shall not exceed 200 feet. Embankments not constructed to design grade and section including allowable tolerance as indicated on the Contractor's compliance survey will not be accepted.

b. The basis for measurement of fill placed by reason of soft material in the foundation being forced outward from the section will be a survey of the area taken prior to fill placement and a second survey of the same area after completion of fill placement. The cross sections will extend 100 feet beyond the toes of the fills.

1.3.3.3 Unit of Measure

Unit of measure: cubic yards.

1.3.4 Separation/Filtration Geotextile

1.3.4.1 Payment

Geotextile installed and accepted will be paid for at the respective contract unit price in the bidding schedule. This unit price shall include the cost of materials, equipment, installation, testing, and other costs associated with placement of the geotextile.

1.4.5.2 Measurement

Measurement shall be made of the as-built surface area in square yards covered by geotextile. Allowance will be made for geotextile in anchor and/or drainage trenches but no allowance will be made for waste, overlaps, damaged materials, repairs, or materials used for the convenience of the Contractor.

1.3.5 Gravel Drain Rock

1.3.5.1 Payment

Payment for gravel, crushed stone, and sand placed for bedding and/or filter material will be made at the applicable contract unit prices for Gravel Drain Rock. Price(s) and payment(s) shall include all costs of furnishing, hauling, placing and maintaining the bedding and/or filter material until placement of the riprap cover is completed and accepted. Geotextiles used as filters will be paid for in accordance with provisions of Section 02373 SEPARATION/FILTRATION GEOTEXTILE. Preparation of the base will not be paid for separately and all costs incidental thereto shall be included in contract prices for other items for which payment will be made. No payment will be made for excess thickness of bedding and/or filter material, nor for material required to replace subgrade material lost by rainwash, wind erosion, overexcavation or otherwise.

1.3.5.2 Measurement

Gravel, placed for bedding and/or filter layers will be measured for payment by the cubic yard. Quantities will be computed to the nearest whole cubic yard. Gravel, crushed stone, and sand will be measured for payment, in the presence of the Contracting Officer, by weighing on approved, accurately calibrated scales furnished by and at the expense of the Contractor. Weight certificates furnished by a public weighmaster will be acceptable.

1.3.5.3 Unit of Measure

Unit of measure: cubic yard.

1.3.6 Outlet Pipe (Sta 70+77)

1.3.6.1 Payment

Payment will be made for costs associated with supplying and installion of the 36-inch diameter CSP outlet pipe and associated fittings, joint bands, and sleeves, and will be paid for at the contract unit price for the number of lineal feet of outlet pipe placed in the accepted work.

1.3.6.2 Measurement

The total quantity of outlet pipe for which payment will be made will be measured to the nearest whole foot along the centerline of the pipe from end to end of the pipe wihouth deduction for the diameter of the water control structure.

1.3.6.3 Unit of Measure

Unit of measure: linear foot.

1.3.7 Flowable Concrete Pipe Bedding

1.3.7.1 Payment

Payment will be made for costs associated with supplying, hauling, installation and compaction (vibrating) of flowable concrete pipe bedding as shown on the contract drawings and specified herein. Payment will be made for each cubic yard of flowable concrete pipe bedding placed in the accepted work.

1.3.7.2 Measurement

The total quantity of flowable concrete pipe bedding for which payment will be made will be the cubic yard volume to the nearest whole cubic yard, calculated from the neat-line dimensions shown on the contract drawings.

1.3.7.3 Unit of Measure

Unit of measure: cubic yard.

1.3.8 Riprap

1.3.8.1 Payment

Payment for riprap satisfactorily placed will be made at the applicable contract unit price for Riprap. Price(s) and payment(s) shall constitute full compensation for furnishing, hauling, handling, placing, and maintaining the riprap until final acceptance by the Government. No separate payment will be made for the stockpiling of riprap, and all cost in connection with stockpiling shall be included in the contract unit price for riprap.

1.3.8.2 Measurement

Riprap will be measured for payment as the weight, as determined from weight certificates, of the material placed.

1.3.8.3 Unit of Measure

Unit of measure: ton.

1.3.9 Toe Drain Piping

1.3.9.1 Payment

Payment will be made for costs associated with supplying and installing the 6-inch diameter corrugated perforated HDPE toe drain pipe and associated fittings as shown on the contract drawings. Payment will be made for pipe at the contract unit price for the number of linear feet of toe drain pipe placed in the accepted work.

1.3.9.2 Measurement

The length of outlet pipe installed will be measured along the centerline of the pipe from end to end of pipe without deduction for the diameter of the water control structure. The length of the toe drain pipe installed will be measured along the centerline of the pipe from end to end of the pipe.

1.3.9.3 Unit of Measure

Unit of measure: lineal foot

1.3.10 Revegetation

1.4.10.1 Payment

Payment will be made for revegetation at the contract unit price for revegetation. This price shall constitute full compensation for all equipment, labor, materials and incidentals necessary to complete the work specified herein. All costs in connection therewith will be considered as a subsidiary obligation of the Contractor. Costs associated with additional revegetation due to inadequate revegetation practices will be born entirely by the Contractor.

1.4.10.2 Measurement

The total quantity of revegetation for which payment will be made will be measured in acres to the nearest one-tenth of an acre, following completion and acceptance of revegetation operations.

1.4.10.3 Unit of Measure

Unit of measure: acre

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

-- End of Section --

SECTION 01310

PROGESS CHART
07/01

PART 1 GENERAL

1.1 SCOPE

This section covers requirements for the Progress Chart, complete.

1.2 GENERAL

The purpose of these requirements is to assure adequate planning and execution of the work, to assist the Contracting Officer in appraising the reasonableness of the proposed schedule, to aid in evaluating progress of the work, and to serve as a basis for periodic progress payments.

PART 2 PRODUCTS

2.1 PROGRESS CHART

The Progress Chart shall conform with CONTRACT CLAUSE titled "Schedule For Construction Contracts." In preparing the Progress Chart, scheduling of construction is the responsibility of the Contractor.

2.2 SCHEDULED EARNINGS CURVES

In addition to the requirements mentioned above, the Contractor shall include with the Progress Chart, the scheduled earnings curves (time versus scheduled earnings). The curve shall be developed to reflect the scheduled earnings, in percentages, for the work scheduled for completion at any time. The curve shall be plotted on graph paper with the Contractor's earnings indicated on the vertical axis and a time scale by months on the horizontal axis. The result will be one "S" curve from which the scheduled progress can be evaluated at the end of each month. The graph will be revised each time there is a major revision in the Progress Chart.

PART 3 EXECUTION (Not Applicable)

-- End of Section --

-- End of Section --

SECTION 01330

SUBMITTAL PROCEDURES
09/97

PART 1 GENERAL

1.1 SUBMITTAL IDENTIFICATION

Submittals required are identified by SD numbers as follows:

SD-01 Data

SD-04 Drawings

SD-06 Instructions

SD-07 Schedules

SD-08 Statements

SD-09 Reports

SD-13 Certificates

SD-14 Samples

SD-18 Records

1.2 SUBMITTAL CLASSIFICATION

Submittals are classified as follows:

1.2.1 Government Approved

Governmental approval is required for extensions of design, critical materials, deviations, equipment whose compatibility with the entire system must be checked, and other items as designated by the Contracting Officer. Within the terms of the Contract Clause entitled "Specifications and Drawings for Construction," they are considered to be "shop drawings."

1.2.2 Information Only

All submittals not requiring Government approval will be for information only. They are not considered to be "shop drawings" within the terms of the Contract Clause referred to above.

1.3 APPROVED SUBMITTALS

The Contracting Officer's approval of submittals shall not be construed as a complete check, but will indicate only that the general method of construction, materials, detailing and other information are satisfactory. Approval will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor under the Contractor Quality Control (CQC) requirements of this contract is responsible for dimensions, the design of adequate connections and details, and the satisfactory construction of all work. After submittals have been approved by the Contracting Officer, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.

1.4 DISAPPROVED SUBMITTALS

The Contractor shall make all corrections required by the Contracting Officer and promptly furnish a corrected submittal in the form and number of copies specified for the initial submittal. If the Contractor considers any correction indicated on the submittals to constitute a change to the contract, a notice in accordance with the Contract Clause "Changes" shall be given promptly to the Contracting Officer.

1.5 WITHHOLDING OF PAYMENT

Payment for materials will not be made if required approvals have not been obtained.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL

The Contractor shall make submittals as required by the specifications. The Contracting Officer may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective sections. Units of weights and measures used on all submittals shall be the same as those used in the contract drawings. Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with contract requirements. Prior to submittal, all items shall be checked and approved by the Contractor's Quality Control (CQC) System Manager and each item shall be stamped, signed, and dated by the CQC System Manager indicating action taken. Proposed deviations from the contract requirements shall be clearly identified. Submittals shall include items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; O&M manuals (including parts list); certifications; warranties; and other such required submittals. Submittals requiring Government approval shall be scheduled and made prior to the acquisition of the material or equipment covered thereby. Samples remaining upon completion of the work shall be picked up and disposed of in accordance with manufacturer's Material Safety Data Sheets (MSDS)

and in compliance with existing laws and regulations.

3.2 SUBMITTAL REGISTER (ENG FORM 4288)

At the end of this section is one set of ENG Form 4288 listing items of equipment and materials for which submittals are required by the specifications; this list may not be all inclusive and additional submittals may be required. The Contractor will also be given the submittal register files, containing the computerized ENG Form 4288 and instructions on the use of the files. These submittal register files will be furnished on a separate diskette. Columns "d" through "r" have been completed by the Government; the Contractor shall complete columns "a" and "s" through "u" and submit the forms (hard copy plus associated electronic file) to the Contracting Officer for approval within 30 calendar days after Notice to Proceed. The Contractor shall keep this diskette up-to-date and shall submit it to the Government together with the monthly payment request. The approved submittal register will become the scheduling document and will be used to control submittals throughout the life of the contract. The submittal register and the progress schedules shall be coordinated.

3.3 SCHEDULING

Submittals covering component items forming a system or items that are interrelated shall be scheduled to be coordinated and submitted concurrently. Certifications to be submitted with the pertinent drawings shall be so scheduled. Adequate time (a minimum of 30 calendar days exclusive of mailing time) shall be allowed and shown on the register for review and approval. No delay damages or time extensions will be allowed for time lost in late submittals.

3.4 TRANSMITTAL FORM (ENG FORM 4025)

The sample transmittal form (ENG Form 4025) attached to this section shall be used for submitting both Government approved and information only submittals in accordance with the instructions on the reverse side of the form. These forms will be furnished to the Contractor. This form shall be properly completed by filling out all the heading blank spaces and identifying each item submitted. Special care shall be exercised to ensure proper listing of the specification paragraph and/or sheet number of the contract drawings pertinent to the data submitted for each item.

3.5 SUBMITTAL PROCEDURE

Submittals shall be made as follows:

3.5.1 Procedures

The Contractor shall submit a minimum of 4 copies of all submittals to the Contracting Officer

3.5.2 Deviations

For submittals which include proposed deviations requested by the Contractor, the column "variation" of ENG Form 4025 shall be checked. The Contractor shall set forth in writing the reason for any deviations and annotate such deviations on the submittal. The Government reserves the right to rescind inadvertent approval of submittals containing unnoted deviations.

3.6 CONTROL OF SUBMITTALS

The Contractor shall carefully control his procurement operations to ensure that each individual submittal is made on or before the Contractor scheduled submittal date shown on the approved "Submittal Register."

3.7 GOVERNMENT APPROVED SUBMITTALS

Upon completion of review of submittals requiring Government approval, the submittals will be identified as having received approval by being so stamped and dated. 2 copies of the submittal will be retained by the Contracting Officer and 2 copies of the submittal will be returned to the Contractor.

3.8 INFORMATION ONLY SUBMITTALS

Normally submittals for information only will not be returned. Approval of the Contracting Officer is not required on information only submittals. The Government reserves the right to require the Contractor to resubmit any item found not to comply with the contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications; will not prevent the Contracting Officer from requiring removal and replacement of nonconforming material incorporated in the work; and does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or for check testing by the Government in those instances where the technical specifications so prescribe.

3.9 STAMPS

Stamps used by the Contractor on the submittal data to certify that the submittal meets contract requirements shall be similar to the following:

CONTRACTOR (Firm Name)
_____ Approved
_____ Approved with corrections as noted on submittal data and/or attached sheets(s).
SIGNATURE: _____
TITLE: _____
DATE: _____

-- End of Section --

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE *(Read instructions on the reverse side prior to initiating this form)*	DATE	TRANSMITTAL NO.

SECTION I - REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS *(This section will be initiated by the contractor)*

TO:	FROM:	CONTRACT NO.	CHECK ONE: ☐ THIS IS A NEW TRANSMITTAL ☐ THIS IS A RESUBMITTAL OF TRANSMITTAL
SPECIFICATION SEC. NO. *(Cover only one section with each transmittal)*	PROJECT TITLE AND LOCATION		CHECK ONE: THIS TRANSMITTAL IS FOR FIO ☐ GOV'T. APPROVAL ☐

ITEM NO. *a.*	DESCRIPTION OF ITEM SUBMITTED *(Type size, model number/etc.)* *b.*	MFG OR CONTR. CAT., CURVE DRAWING OR BROCHURE NO. *(See instruction no. 8)* *c.*	NO. OF COPIES *d.*	CONTRACT REFERENCE DOCUMENT		FOR CONTRACTOR USE CODE *g.*	VARIATION *(See instruction No. 6)* *h.*	FOR CE USE CODE *i.*
				SPEC. PARA. NO. *e.*	DRAWING SHEET NO. *f.*			

REMARKS	I certify that the above submitted items have been reviewed in detail and are correct and in strict conformance with the contract drawings and specifications except as other wise stated. NAME AND SIGNATURE OF CONTRACTOR

SECTION II - APPROVAL ACTION

ENCLOSURES RETURNED *(List by Item No.)*	NAME, TITLE AND SIGNATURE OF APPROVING AUTHORITY	DATE

INSTRUCTIONS

1. Section I will be initiated by the Contractor in the required number of copies.

2. Each transmittal shall be numbered consecutively in the space provided for "Transmittal No.". This number, in addition to the contract number, will form a serial number for identifying each submittal. For new submittals or resubmittals mark the appropriate box; on resubmittals, insert transmittal number of last submission as well as the new submittal number.

3. The "Item No." will be the same "Item No." as indicated on ENG FORM 4288-R for each entry on this form.

4. Submittals requiring expeditious handling will be submitted on a separate form.

5. Separate transmittal form will be used for submittals under separate sections of the specifications.

6. A check shall be placed in the "Variation" column when a submittal is not in accordance with the plans and specifications--also, a written statement to that effect shall be included in the space provided for "Remarks".

7. Form is self-transmittal, letter of transmittal is not required.

8. When a sample of material or Manufacturer's Certificate of Compliance is transmitted, indicate "Sample" or "Certificate" in column c, Section I.

9. U.S. Army Corps of Engineers approving authority will assign action codes as indicated below in space provided in Section I, column i to each item submitted. In addition they will ensure enclosures are indicated and attached to the form prior to return to the contractor. The Contractor will assign action codes as indicated below in Section I, column g, to each item submitted.

THE FOLLOWING ACTION CODES ARE GIVEN TO ITEMS SUBMITTED

A -- Approved as submitted.

B -- Approved, except as noted on drawings.

C -- Approved, except as noted on drawings. Refer to attached sheet resubmission required.

D -- Will be returned by separate correspondence.

E -- Disapproved (See attached).

F -- Receipt acknowledged.

FX -- Receipt acknowledged, does not comply as noted with contract requirements.

G -- Other *(Specify)*

10. Approval of items does not relieve the contractor from complying with all the requirements of the contract plans and specifications.

(Reverse of ENG Form 4025-R)

SUBMITTAL REGISTER

CONTRACT NO.
DACW41-02-B-0005

TITLE AND LOCATION
Section 206: Lake Nemaha Wetlands

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01270	SD-01 Preconstruction Submittals															
			Weight Certificates															
			FIO															
		01354	SD-08 Manufacturer's Instructions															
			Retention Pond Removal Plan															
			GA															
			Mill Certificate or Affidavit	2.1.3														
			FIO															
			Materials Other Than Salable Timber	3.3.1														
		02316	SD-09 Manufacturer's Field Reports															
			Field Density Tests	3.4.3														
			Testing of Backfill Materials	3.4.2														
		02331	SD-08 Manufacturer's Instructions															
			Shoring, Sheeting, and Bracing															
			GA															
			Excavation															
			Borrow Areas															
			Plan of Operations															
			Embankment and Backfill Materials															
			Filter Materials															
			Nuclear Density Testing Equipment Operator															

SUBMITTAL REGISTER

CONTRACT NO.
DACW41-02-B-0005

TITLE AND LOCATION
Section 206: Lake Nemaha Wetlands

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		02331	SD-09 Manufacturer's Field Reports															
			Survey Records															
			GA															
			Contractor-Furnished Rights-of-way for Drainage FlO															
		02373	SD-01 Preconstruction Submittals															
			Thread	2.1.2														
			SD-06 Test Reports															
			Manufacturing Quality Control Sampling and Testing															
			SD-09 Manufacturer's Field Reports															
			Seams	3.2														
			Geotextile	2.1.1														
		02380	SD-01 Preconstruction Submittals															
			Redesign Data															
			GA															
			Riprap	2.3.2														
			Filter Material															
			Ready-Mix Concrete Grout															
			FlO															
			Conveying and Placing															
			Admixtures															
			Curing Materials															

SUBMITTAL REGISTER

CONTRACT NO.
DACW41-02-B-0005

TITLE AND LOCATION
Section 206: Lake Nemaha Wetlands

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		02380	Batching and Mixing Equipment															
			Gaging Table Data															
			SD-09 Manufacturer's Field															
			Reports															
			Gradation Test															
			GA															
			Stone	1.4.1.3														
			FIO															
			Laboratory	2.3.1.1														
			Laboratory	2.3.1.1														
			GA															
			Weigh Scale Certification															
			Certified Weight Scale Tickets															
			Stone	1.4.1.3														
			GA															
			Bulk Specific Gravity	3.5.1.1														
			FIO															
		02630	SD-06 Test Reports															
			Placing Pipe	3.3														
			GA															
			Resin Certification															
			GA															
			Pipeline Testing	3.8														
			Hydrostatic Test on Watertight Joints	2.4														
			Determination of Density	3.7.5														

SUBMITTAL REGISTER

CONTRACT NO.
DACW41-02-B-0005

TITLE AND LOCATION
Section 206: Lake Nemaha Wetlands

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ~~ITEM SUBMITTED~~	PARAGRAPH #	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
							~~SUBMIT~~	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION		DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		02630	Pipe for Culverts and Storm Drains	2.1														
			GA															
		02921	SD-01 Preconstruction Submittals															
			Equipment															
			GA															
			Surface Erosion Control Material	2.7														
			Chemical Treatment Material															
			SD-07 Certificates															
			Equipment															
			GA															
			SD-08 Manufacturer’s Instructions															
			Delivery	1.4.1														
			GA															
			Finished Grade and Topsoil	3.2.1														
			Topsoil	2.2														
			SD-09 Manufacturer’s Field Reports															
			Equipment Calibration	3.1.3														
			GA															
			Soil Test	3.1.4														
			Seed	2.1														
			GA															
			Topsoil	2.2														
			pH Adjuster	2.3.1														
			Fertilizer	2.3.2														

SUBMITTAL REGISTER

CONTRACT NO.
DACW41-02-B-0005

TITLE AND LOCATION
Section 206: Lake Nemaha Wetlands

CONTRACTOR

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		02921	Organic Material	2.3.3															
			Soil Conditioner	2.3.4															
			Mulch	2.4															
			Pesticide	2.6															
			FIO																
			Delivered Topsoil	1.4.1.1															
			GA																
			Soil Amendments	2.3															
			Mulch	2.4															
			Quantity Check	3.5															
			GA																
			Seed Establishment Period	3.9															
			Maintenance Record	3.9.3.5															
			Application of Pesticide	3.6															
			FIO																
		03200	SD-04 Samples																
			Concrete Reinforcement System																
			GA																
			SD-08 Manufacturer's Instructions																
			Welding	1.3															
			GA																
			Reinforcing Steel	2.3															
			GA																
		03301	SD-01 Preconstruction Submittals																
			Concrete Mixture Proportioning	2.2															
			FIO																

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		03301	Batch Plant	3.1.2														
			Concrete Mixers	3.1.3														
			Conveying Equipment	3.1.4														
			Placing Equipment	3.1.1														
			SD-08 Manufacturer’s Instructions															
			Testing Technicians	3.7.1														
			FIO															
			Concrete Construction Inspector	3.7.1														
			Construction Joint Treatment	3.2.4														
			GA															
			Curing and Protection	3.5														
			Cold-Weather Placing	3.3.4														
			Hot-Weather Placing	3.3.5														
			SD-09 Manufacturer’s Field Reports															
			Aggregate Quality	3.7.2.3														
			GA															
			Uniformity of Concrete Mixing	3.7.2.13														
			FIO															
			Tests and Inspections	3.7														
			Tests and Inspections	3.7														
			Impervious-Sheet Curing Materials	2.1.4.1														
			FIO															
			Air-Entraining Admixture	2.1.3.1														
			Other Chemical Admixtures															

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		03301	Epoxy Resin	2.1.9														
			Latex Bonding Compound	2.1.8														
			Nonshrink Grout	2.1.6														
			Aggregates	1.4.1.1														
			Aggregates	1.4.1.1														
			GA															
			Cementitious Materials,	1.4.1.2														
			Admixtures, and Curing															
			Compound															

SECTION 01354

ENVIRONMENTAL PROTECTION FOR CIVIL WORKS
10/95

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

CODE OF FEDERAL REGULATIONS (CFR)

40 CFR 261	Identification and Listing of Hazardous Waste

ENGINEERING MANUALS (EM)

EM 385-1-1	(1996) U.S. Army Corps on Engineers Safety and Health Requirements Manual

1.2 DEFINITIONS

Environmental pollution and damage is defined as the presence of chemical, physical, or biological elements or agents that adversely affect human health or welfare; unfavorably alter ecological balances of plant or animal communities; or degrade the environment from an aesthetic, cultural or historic perspective. Environmental protection is the prevention/control of pollution and habitat disruption that may occur during construction. The control of environmental pollution and damage requires consideration of air, water, land, biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive materials; and other pollutants.

1.3 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-08 Statements

Retention Pond Removal Plan; GA.

Submit plan detailing Contractor's procedures for testing and removal of retention pond sediment.

1.4 ENVIRONMENTAL PROTECTION REQUIREMENTS

The Contractor shall comply with all applicable Federal, State, and local laws and regulations. The Contractor shall provide environmental protective measures and procedures to prevent and control pollution, limit habitat disruption, and correct environmental damage that occurs during construction.

1.4.1 Protection of Features

This section supplements the Contract Clause PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS (APR 1984). The Contractor shall prepare a list of features requiring protection under the provisions of the contract clause which are not specially identified on the drawings as environmental features requiring protection. The Contractor shall protect those environmental features, indicated specially on the drawings, in spite of interference which their preservation may cause to the Contractor's work under the contract.

1.4.2 Permits

This section supplements the Contractor's responsibility under the contract clause PERMITS AND RESPONSIBILITIES to the extent that the Government has already obtained environmental permits. The Government has obtained permits for wetland disturbance, NPDES and berm construction under the U.S. Army Corps of Engineers and Kansas Division of Water Resources regulations. The contractor shall comply with the terms, and conditions of these permits. The contractor shall also comply with other environmental commitments made by the Government. Copies of permit terms and conditions as well as those other commitments made by the Government are included at the end of this section.

1.4.3 Special Environmental Requirements

The Contractor shall comply with the special environmental requirements included at the end of this section. These special environmental requirements are an outgrowth of environmental commitments made by the Government during the project development.

1.4.4 Environmental Assessment of Contract Deviations

The Contract specifications have been prepared to comply with the special conditions and mitigation measures of an environmental nature which were established during the planning and development of this project. The Contractor is advised that deviations from the drawings or specifications (e.g., proposed alternate borrow areas, disposal areas, staging areas, alternate access routes, etc.) could result in the requirement for the Government to reanalyze the project from an environmental standpoint. Deviations from the construction methods and procedures indicated by the plans and specifications which may have an environmental impact will require an extended review, processing, and approval time by the Government. The Contracting Officer reserves the right to disapprove alternate methods, even if they are more cost effective, if the Contracting Officer determines that the proposed alternate method will have an adverse environmental impact.

1.5 ENVIRONMENTAL PROTECTION PLAN

Within 20 calendar days of Notice of Award, the Contractor shall submit an Environmental Protection Plan for review and acceptance by the Contracting Officer. The Government will consider an interim plan for the first 30 days of operations. However, the Contractor shall furnish an acceptable final plan not later than 30 calendar days after receipt of the Notice to Proceed. Acceptance is conditional and is predicated upon satisfactory performance during construction. The Government reserves the right to require the Contractor to make changes in the Environmental Protection Plan or operations if the Contracting Officer determines that environmental protection requirements are not being met. The plan shall detail the actions which the Contractor shall take to comply with all applicable Federal, State, and local laws and regulations concerning environmental protection and pollution control and abatement, as well as the additional specific requirements of this contract. No physical work at the site shall begin prior to acceptance of the Contractor s plan or an interim plan covering the work to be performed. The environmental protection plan shall include, but not be limited to, the following:

1.5.1 List of State and Local Laws and Regulations

The Contractor shall provide as part of the Environmental Protection Plan a list of all State and local environmental laws and regulations which apply to the construction operations under the Contract.

1.5.2 Spill Control Plan

The Contractor shall include as part of the environmental protection plan, a Spill Control Plan. The plan shall include the procedures, instructions, and reports to be used in the event of an unforeseen spill of a substance regulated by the Emergency Response and Community Right-to-Know Act or regulated under State or local laws or regulations. The Spill Control Plan supplements the requirements of EM 385-1-1. This plan shall include as a minimum:

a. The name of the individual who will be responsible for implementing and supervising the containment and cleanup.

b. Training requirements for Contractor's personnel and methods of accomplishing the training.

c. A list of materials and equipment to be immediately available at the job site, tailored to cleanup work of the potential hazard(s) identified.

d. The names and locations of suppliers of containment materials and locations of additional fuel oil recovery, cleanup, restoration, and material-placement equipment available in case of an unforeseen spill emergency.

e. The methods and procedures to be used for expeditious contaminant cleanup.

f. The name of the individual who will report any spills or hazardous substance releases and who will follow up with complete documentation. This individual shall immediately notify the Contracting Officer in addition to the legally required Federal, State, and local reporting channels (including the National Response Center 1-800-424-8802) if a reportable quantity spill occurs. The plan shall contain a list of the required reporting channels and telephone numbers.

1.5.3 Recycling and Waste Minimization Plan

The Contractor shall submit a Recycling and Waste Minimization Plan as a part of the Environmental Protection Plan. The plan shall detail the Contractor's actions to comply with the following recycling and waste minimization requirements:

a. The Contractor shall participate in State and local government sponsored recycling programs to reduce the volume of solid waste materials at the source.

1.5.4 Contaminant Prevention Plan

As a part of the Environmental Protection Plan, the Contractor shall prepare a contaminant prevention statement identifying potentially hazardous substances to be used on the job site and intended actions to prevent accidental or intentional introduction of such materials into the air, water, or ground. The Contractor shall detail provisions to be taken to meet Federal, State, and local laws and regulations regarding the storage and handling of these materials.

1.5.5 Environmental Monitoring

The Contractor shall include in the plan the details of environmental monitoring requirements under the laws and regulations and a description of how this monitoring will be accomplished.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 SPECIAL ENVIRONMENTAL PROTECTION REQUIREMENTS

3.1.1 Tree Protection

No ropes, cables, or guys shall be fastened to or attached to any tree(s) for anchorage unless specifically authorized by the Contracting Officer. Where such special use is permitted, the Contractor shall provide effective protection to prevent damage to the tree and other land and vegetative resources. Unless specifically authorized by the Contracting Officer, no construction equipment or materials shall be placed or used within the drip line of trees shown on the drawings to be saved. No excavation or fill shall be permitted within the drip line of trees to be saved except as shown on the drawings.

3.1.2 U.S. Department of Agriculture (USDA) Quarantined Considerations

The Contractor shall thoroughly clean all construction equipment at the prior job site in a manner that ensures all residual soil is removed and that egg deposits from plant pests are not present. The Contractor shall consult with the USDA Plant Protection and Quarantine (USDA - PPQ) jurisdictional office for additional cleaning requirements that may be necessary.

3.1.3 Commercial Borrow

Prior to bringing commercially obtained borrow material onsite, the Contractor shall provide the Contracting Officer with the location of the pit or pits, the names of the owners and operators, and the types and estimated quantities of materials to be obtained from each source.

3.1.4 Soil Disposal Areas on Government Property

Soil disposal on Government property shall be made only in those areas designated on the contract drawings. Hazardous, toxic, and radiological wastes (HTRW) shall not be disposed of on Government property. Disposal operations shall be managed and controlled to prevent erosion of soil or sediment from entering nearby waters or wetlands. Disposal operations shall be developed and managed in accordance with the grading plan shown on the drawings or as approved by the Contracting Officer.

3.1.5 Disposal of Solid Wastes

Solid waste is rubbish, debris, waste materials, garbage, and other discarded solid materials (excluding clearing debris and hazardous waste as defined in following paragraphs). Solid waste shall be placed in containers and disposed on a regular schedule. All handling and disposal shall be conducted in such a way as to prevent spillage and contamination. The Contractor shall transport all solid waste off Government property and dispose in compliance with Federal, State, and local requirements.

3.1.6 Clearing Debris

Clearing debris is trees, tree stumps, tree trimmings, and shrubs, and leaves, vegetative matter, excavated natural materials (e.g., dirt, sand, and rock), and demolition products (e.g., brick, concrete, glass, and metals).

a. The Contractor shall collect trees, tree stumps, tree trimmings, shrubs, leaves, and other vegetative matter; and shall dispose of them in compliance with Federal, State, and local requirements. The Contractor shall segregate the matter where appropriate for proper disposal. Untreated and unpainted scrap lumber may be disposed of with this debris where appropriate.

b. Excavated natural materials shall be placed in the designated area on the drawings.

c. Demolition products shall be transported from Government property for proper disposal in compliance with Federal, State, and local requirements.

3.1.7 Disposal of Contractor Generated Hazardous Wastes

Hazardous wastes are wastes as defined in 40 CFR 261, and as defined by applicable State and local regulations. Hazardous waste generated by construction activities shall be removed from the work area and be disposed in compliance with Federal, State, and local requirements. The Contractor shall segregate hazardous waste from other materials and wastes, and shall protect it from the weather by placing it in a safe covered location; precautionary measures against accidental spillage such as berming or other appropriate measures shall be taken. Hazardous waste shall be removed from Government property within 60 days. Hazardous waste shall not be dumped onto the ground, into storm sewers or open water courses, or into the sanitary sewer system.

3.1.8 Fuels and Lubricants

Fueling and lubrication of equipment and motor vehicles shall be conducted in a manner that affords the maximum protection against spills and evaporation. Lubricants and waste oil to be discarded shall be stored in marked corrosion-resistant containers and recycled or disposed in accordance with Federal, State, and local laws and regulations.

3.2 HISTORICAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

3.2.1 Known Historic, Archaeological, and Cultural Resources

Known historic, archaeological, and cultural resources within the Contractor's work area are marked on the contract drawings. The Contractor shall install protection for these resources as shown on the drawings and shall be responsible for their preservation during the contract.

3.2.2 Discovered Historic, Archaeological, and Cultural Resources

If during construction activities, items are observed that may have historic or archaeological value (e.g., Native American human remains or associated objects are discovered), such observations shall be reported immediately to the Contracting Officer so that the appropriate authorities may be notified and a determination made as to their significance and what, if any, special disposition of the finds should be made. The Contractor shall cease all activities that may result in impact to or the destruction of these resources. The Contractor shall prevent his employees from trespassing on, removing, or otherwise disturbing such resources.

3.3 PROTECTION OF WATER RESOURCES

The Contractor shall keep construction activities under surveillance, management, and control to avoid pollution of surface and ground waters.

3.3.1 Wastewater

Wastewater directly derived from construction activities shall not be discharged before being treated to remove pollutants.

3.3.2 Monitoring of Water Areas Affected by Construction Activities

The Contractor shall perform discharge monitoring, inspections, stormwater sampling and testing, reporting, and record keeping as set forth in the permit conditions which are attached to this section.

3.4 PROTECTION OF FISH AND WILDLIFE RESOURCES

The Contractor shall conform to the applicable laws of the State of Kansas for the protection of fish and wildlife resources.

3.5 PROTECTION OF AIR RESOURCES

Special management techniques as set out below shall be implemented to control air pollution by the construction activities. These techniques supplement the requirements of Federal, State, and local laws and regulations; and the safety requirements under this Contract. If any of the following techniques conflict with the requirements of Federal, State, or local laws or regulations, or safety requirements under this contract, then those requirements shall be followed in lieu of the following.

3.5.1 Particulates

Airborne particulates, including dust particles, from construction activities and processing and preparation of materials shall be controlled at all times, including weekends, holidays, and hours when work is not in progress. The Contractor shall maintain all excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, disposal sites, borrow areas, and all other work areas free from airborne dust which would cause a hazard or nuisance.

3.6 INSPECTION

If the Contracting Officer notifies the Contractor in writing of any observed noncompliance with contract requirements or Federal, State, or local laws, regulations, or permits, the Contractor shall inform the Contracting Officer of proposed corrective action and take such action to correct the noncompliance. If the Contractor fails to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action is taken. No time extensions will be granted or costs or damages allowed to the Contractor for any such suspension.

3.7 MAINTENANCE OF POLLUTION CONTROL FACILITIES

The Contractor shall maintain all constructed pollution control facilities and portable pollution control devices for the duration of the Contract or for the length of time construction activities create the particular pollutant.

3.8 TRAINING OF CONTRACTOR PERSONNEL

Contractor personnel shall be trained in environmental protection and pollution control. The Contractor shall conduct environmental protection/pollution control meetings for all Contractor personnel monthly. The training and meeting agenda shall include methods of detecting and avoiding pollution, familiarization with pollution standards, both statutory and contractual, installation and care of facilities (vegetative covers, etc.), and instruments required for monitoring purposes to ensure adequate and continuous environmental protection/pollution control. Anticipated hazardous or toxic chemicals or wastes, and other regulated contaminants, shall also be discussed. Other items to be discussed shall include recognition and protection of archaeologic sites and artifacts.

-- End of Section --

SECTION 01356

STORM WATER POLLUTION PREVENTION MEASURES
08/96

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 4439	(1997) Standard Terminology for Geosynthetics
ASTM D 4491	(1996) Water Permeability of Geotextiles by Permittivity
ASTM D 4533	(1991; R 1996) Trapezoid Tearing Strength of Geotextiles
ASTM D 4632	(1991; R 1996)) Grab Breaking Load and Elongation of Geotextiles
ASTM D 4751	(1995) Determining Apparent Opening Size of a Geotextile
ASTM D 4873	(1995) Identification, Storage, and Handling of Geosynthetic Rolls

1.2 GENERAL

The Contractor shall implement the storm water pollution prevention measures specified in this section in a manner which will meet the requirements of Section 01354 ENVIRONMENTAL PROTECTION, and the requirements of the National Pollution Discharge Elimination System (NPDES) permit attached to that Section.

1.3 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-13 Certificates

Mill Certificate or Affidavit; FIO.

1.4 EROSION AND SEDIMENT CONTROLS

The controls and measures required by the Contractor are described below.

1.4.1 Stabilization Practices

The stabilization practices to be implemented shall include temporary seeding, mulching, geotextiles, sod stabilization, vegetative buffer strips, erosion control matts, protection of trees, preservation of mature vegetation, etc. On his daily CQC Report, the Contractor shall record the dates when the major grading activities occur, (e.g., clearing and grubbing, excavation, embankment, and grading); when construction activities temporarily or permanently cease on a portion of the site; and when stabilization practices are initiated. Except as provided in paragraphs UNSUITABLE CONDITIONS and NO ACTIVITY FOR LESS THAN 21 DAYS, stabilization practices shall be initiated as soon as practicable, but no more than 14 days, in any portion of the site where construction activities have temporarily or permanently ceased.

1.4.1.1 Unsuitable Conditions

Where the initiation of stabilization measures by the fourteenth day after construction activity temporarily or permanently ceases is precluded by unsuitable conditions caused by the weather, stabilization practices shall be initiated as soon as practicable after conditions become suitable.

1.4.1.2 No Activity for Less Than 21 Days

Where construction activity will resume on a portion of the site within 21 days from when activities ceased (e.g., the total time period that construction activity is temporarily ceased is less than 21 days), then stabilization practices do not have to be initiated on that portion of the site by the fourteenth day after construction activity temporarily ceased.

1.4.2 Structural Practices

Structural practices shall be implemented to divert flows from exposed soils, temporarily store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Structural practices shall be implemented in a timely manner during the construction process to minimize erosion and sediment runoff. Structural practices shall include the following devices. Location and details of installation and construction are shown on the drawings.

1.4.2.1 Silt Fences

The Contractor shall provide silt fences as a temporary structural practice to minimize erosion and sediment runoff. Silt fences shall be properly installed to effectively retain sediment immediately after completing each phase of work where erosion would occur in the form of sheet and rill erosion (e.g. clearing and grubbing, excavation, embankment, and grading). Silt fences shall be installed in the locations indicated on the drawings. Final removal of silt fence barriers shall be upon approval by the Contracting Officer.

1.4.2.2 Straw Bales

The Contractor shall provide bales of straw as a temporary structural practice to minimize erosion and sediment runoff. Bales shall be properly placed to effectively retain sediment immediately after completing each phase of work (e.g., clearing and grubbing, excavation, embankment, and grading) in each independent runoff area (e.g., after clearing and grubbing in a area between a ridge and drain, bales shall be placed as work progresses, bales shall be removed/replaced/relocated as needed for work to progress in the drainage area). Areas where straw bales are to be used are shown on the drawings. Final removal of straw bale barriers shall be upon approval by the Contracting Officer. Rows of bales of straw shall be provided as follows:

a. Along the downhill perimeter edge of all areas disturbed.

b. Along the top of the slope or top bank of drainage ditches, channels, swales, etc. that traverse disturbed areas.

c. Along the toe of all cut slopes and fill slopes of the construction areas.

d. Perpendicular to the flow in the bottom of existing drainage ditches, channels, swales, etc. that traverse disturbed areas or carry runoff from disturbed areas. Rows shall be spaced a maximum of 50 feet apart.

e. Perpendicular to the flow in the bottom of new drainage ditches, channels, and swales. Rows shall be spaced a maximum of 50 feetapart.

f. At the entrance to culverts that receive runoff from disturbed areas.

PART 2 PRODUCTS

2.1 COMPONENTS FOR SILT FENCES

2.1.1 Filter Fabric

The geotextile shall comply with the requirements of ASTM D 4439, and shall consist of polymeric filaments which are formed into a stable network such that filaments retain their relative positions. The filament shall consist of a long-chain synthetic polymer composed of at least 85 percent by weight of ester, propylene, or amide, and shall contain stabilizers and/or inhibitors added to the base plastic to make the filaments resistance to deterioration due to ultraviolet and heat exposure. Synthetic filter fabric shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life at a temperature range of 0 to 120 degrees F. The filter fabric shall meet the following requirements:

FILTER FABRIC FOR SILT SCREEN FENCE

PHYSICAL PROPERTY	TEST PROCEDURE	STRENGTH REQUIREMENT
Grab Tensile	ASTM D 4632	100 lbs. min.
Elongation (%)		30 % max.
Trapezoid Tear	ASTM D 4533	55 lbs. min.
Permittivity	ASTM D 4491	0.2 sec-1
AOS (U.S. Std Sieve)	ASTM D 4751	20-100

2.1.2 Silt Fence Stakes and Posts

The Contractor may use either wooden stakes or steel posts for fence construction.

2.1.3 Mill Certificate or Affidavit

A mill certificate or affidavit shall be provided attesting that the fabric and factory seams meet chemical, physical, and manufacturing requirements specified above. The mill certificate or affidavit shall specify the actual Minimum Average Roll Values and shall identify the fabric supplied by roll identification numbers. The Contractor shall submit a mill certificate or affidavit signed by a legally authorized official from the company manufacturing the filter fabric.

2.1.4 Identification Storage and Handling

Filter fabric shall be identified, stored and handled in accordance with ASTM D 4873.

2.2 COMPONENTS FOR STRAW BALES

The straw in the bales shall be stalks from oats, wheat, rye, barley, rice, or from grasses such as byhalia, bermuda, etc., furnished in air dry condition. All bales shall be either wire-bound or string-tied. The Contractor may use either wooden stakes or steel posts to secure the straw bales to the ground. Wooden stakes utilized for this purpose, shall have a minimum dimensions of 2 inches x 2 inches in cross section and shall have a minimum length of 3 feet. Steel posts (standard "U" or "T" section) utilized for securing straw bales, shall have a minimum weight of 1.33 pounds per linear foot and a minimum length of 3 feet.

PART 3 EXECUTION

3.1 INSTALLATION OF SILT FENCES

Silt fences shall extend a minimum of 16 inches above the ground surface and shall not exceed 34 inches above the ground surface. Filter fabric shall be from a continuous roll cut to the length of the barrier to avoid the use of joints. When joints are unavoidable, filter fabric shall be spliced together at a support post, with a minimum 6 inch overlap, and securely sealed. A trench shall be excavated approximately 4 inches wide and 4 inches deep on the upslope side of the location of the silt fence. The 4-inch by 4-inch trench shall be backfilled and the soil compacted over the filter fabric. Silt fences

shall be removed upon approval by the Contracting Officer.

3.2 INSTALLATION OF STRAW BALES

Straw bales shall be placed in a single row, lengthwise on the contour, with ends of adjacent bales tightly abutting one another. Straw bales shall be installed so that bindings are oriented around the sides rather than along the tops and bottoms of the bales in order to prevent deterioration of the bindings. The barrier shall be entrenched and backfilled. A trench shall be excavated the width of a bale and the length of the proposed barrier to a minimum depth of 4 inches. After the bales are staked and chinked (gaps filled by wedging with straw), the excavated soil shall be backfilled against the barrier. Backfill soil shall conform to the ground level on the downhill side and shall be built up to 4 inches against the uphill side of the barrier. Loose straw shall be scattered over the area immediately uphill from a straw bale barrier to increase barrier efficiency. Each bale shall be securely anchored by at least two stakes driven through the bale. The first stake or steel post in each bale shall be driven toward the previously laid bale to force the bales together. Stakes or steel pickets shall be driven a minimum 18 inches deep into the ground to securely anchor the bales.

3.3 MAINTENANCE

The Contractor shall maintain the temporary and permanent vegetation, erosion and sediment control measures, and other protective measures in good and effective operating condition by performing routine inspections to determine condition and effectiveness, by restoration of destroyed vegetative cover, and by repair of erosion and sediment control measures and other protective measures. The following procedures shall be followed to maintain the protective measures.

3.3.1 Silt Fence Maintenance

Silt fences shall be inspected in accordance with paragraph INSPECTIONS. Any required repairs shall be made promptly. Close attention shall be paid to the repair of damaged silt fence resulting from end runs and undercutting. Should the fabric on a silt fence decompose or become ineffective, and the barrier is still necessary, the fabric shall be replaced promptly. Sediment deposits shall be removed when deposits reach one-third of the height of the barrier. When a silt fence is no longer required, it shall be removed. The immediate area occupied by the fence and any sediment deposits shall be shaped to an acceptable grade.

3.3.2 Straw Bale Maintenance

Straw bale barriers shall be inspected in accordance with paragraph INSPECTIONS. Close attention shall be paid to the repair of damaged bales, end runs and undercutting beneath bales. Necessary repairs to barriers or replacement of bales shall be accomplished promptly. Sediment deposits shall be removed when deposits reach one-half of the height of the barrier. Bale rows used to retain sediment shall be turned uphill at each end of each row. When a straw bale barrier is no longer required, it shall be removed. The immediate area occupied by the bales and any sediment deposits shall be shaped to an acceptable grade. The areas disturbed by this shaping shall be seeded in accordance with Section 02921 SEEDING.

3.3.3 Diversion Dike Maintenance

Diversion dikes shall be inspected in accordance with paragraph INSPECTIONS. Close attention shall be paid to the repair of damaged diversion dikes and necessary repairs shall be accomplished promptly. When diversion dikes are no longer required, they shall be shaped to an acceptable grade. The areas disturbed by this shaping shall be seeded in accordance with Section 02921 SEEDING.

3.4 INSPECTIONS

3.4.1 General

The Contractor shall inspect disturbed areas of the construction site, areas used for storage of materials that are exposed to precipitation that have not been finally stabilized, stabilization practices, structural practices, other controls, and area where vehicles exit the site at least once every seven (7) calendar days and within 24 hours of the end of any storm that produces 0.5 inches or more rainfall at the site. Where sites have been finally stabilized, such inspection shall be conducted at least once every month.

3.4.2 Inspections Details

Disturbed areas and areas used for material storage that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. Erosion and sediment control measures identified in the Storm Water Pollution Prevention Plan shall be observed to ensure that they are operating correctly. Discharge locations or points shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Locations where vehicles exit the site shall be inspected for evidence of offsite sediment tracking.

3.4.3 Inspection Reports

For each inspection conducted, the Contractor shall prepare a report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the Storm Water Pollution Prevention Plan, maintenance performed, and actions taken. The report shall be furnished to the Contracting Officer within 24 hours of the inspection as a part of the Contractor's daily CQC REPORT. A copy of the inspection report shall be maintained on the job site.

-- End of Section --

SECTION 01451

CONTRACTOR QUALITY CONTROL
04/97

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 3740	(1996) Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
ASTM E 329	(1995b) Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

1.2 PAYMENT

Separate payment will not be made for providing and maintaining an effective Quality Control program, and all costs associated therewith shall be included in the applicable unit prices or lump-sum prices contained in the Bidding Schedule.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Contract Clause titled "Inspection of Construction." The quality control system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. The system shall cover all construction operations, both onsite and offsite, and shall be keyed to the proposed construction sequence. The project superintendent will be held responsible for the quality of work on the job and is subject to removal by the Contracting Officer for non-compliance with quality requirements specified in the contract. The project superintendent in this context shall mean the individual with the responsibility for the overall management of the project including quality and production.

3.2 QUALITY CONTROL PLAN

The Contractor shall furnish for review by the Government, not later than 30 days after receipt of notice to proceed, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract Clause titled "Inspection of Construction." The plan shall identify personnel, procedures, control, instructions, tests, records, and forms to be used. The Government will consider an interim plan for the first 15 days of operation. Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started. Work outside of the features of work included in an accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional features of work to be started.

3.2.1 Content of the CQC Plan

The CQC Plan shall include, as a minimum, the following to cover all construction operations, both onsite and offsite, including work by subcontractors, fabricators, suppliers, and purchasing agents:

a. A description of the quality control organization clearly indicating lines of authority and acknowledgment that the CQC staff shall implement the three phase control system for all aspects of the work specified. The staff shall include a CQC System Manager who shall report to the project superintendent.

b. The name, qualifications , duties, responsibilities, and authorities of each person assigned a CQC function.

c. A copy of the letter to the CQC System Manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop work which is not in compliance with the contract.

d. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers, and purchasing agents. These procedures shall be in accordance with Section 01330 SUBMITTAL PROCEDURES.

e. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. (Laboratory facilities will be approved by the Contracting Officer.)

f. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.

g. Procedures for tracking construction deficiencies from identification through acceptable corrective action. These procedures shall establish verification that identified deficiencies have been corrected.

h. Reporting procedures, including proposed reporting formats.

i. A list of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks, has separate control requirements, and may be identified by different trades or disciplines, or it may be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there are frequently more than one definable features under a particular section. This list will be agreed upon during the coordination meeting.

3.2.2 Acceptance of Plan

Acceptance of the Contractor's plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The Government reserves the right to require the Contractor to make changes in his CQC Plan and operations including removal of personnel, as necessary, to obtain the quality specified.

3.2.3 Notification of Changes

After acceptance of the CQC Plan, the Contractor shall notify the Contracting Officer in writing of any proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

3.3 COORDINATION MEETING

After the Preconstruction Conference, before start of construction, and prior to acceptance by the Government of the CQC Plan, the Contractor shall meet with the Contracting Officer or Authorized Representative and discuss the Contractor's quality control system. The CQC Plan shall be submitted for review a minimum of 14 calendar days prior to the Coordination Meeting. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. Minutes of the meeting shall be prepared by the Government and signed by both the Contractor and the Contracting Officer. The minutes shall become a part of the contract file. There may be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which may require corrective action by the Contractor.

3.4 QUALITY CONTROL ORGANIZATION

3.4.1 Personnel Requirements

The requirements for the CQC organization are a CQC System Manager and sufficient number of additional qualified personnel to ensure contract compliance. The Contractor shall provide a CQC organization which shall be at the site at all times during progress of the work and with complete authority to take any action necessary to ensure compliance with the contract. All CQC staff members shall be subject to acceptance by the Contracting Officer.

3.4.2 CQC System Manager

The Contractor shall identify as CQC System Manager an individual within the onsite work organization who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System Manager shall be a construction person with a minimum of 10 years construction experience on construction similar to this contract. This CQC System Manager shall be on the site at all times during construction and shall be employed by the prime Contractor. The CQC System Manager shall be assigned as System Manager but may have duties as project superintendent in addition to quality control. An alternate for the CQC System Manager shall be identified in the plan to serve in the event of the System Manager's absence. The requirements for the alternate shall be the same as for the designated CQC System Manager.

3.4.3 CQC Personnel

In addition to CQC personnel specified elsewhere in the contract, the Contractor shall provide as part of the CQC organization specialized personnel to assist the CQC System Manager. These individuals may be employees of the prime or subcontractor; be responsible to the CQC System Manager; be physically present at the construction site during work on their areas of responsibility; and have the necessary education and/or experience in their related field.

3.5 SUBMITTALS AND DELIVERABLES

Submittals, if needed, shall be made as specified in Section 01330 SUBMITTAL PROCEDURES. The CQC organization shall be responsible for certifying that all submittals and deliverables are in compliance with the contract requirements.

3.6 CONTROL

Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. At least three phases of control shall be conducted by the CQC System Manager for each definable feature of work as follows:

3.6.1 Preparatory Phase

This phase shall be performed prior to beginning work on each definable feature of work, after all required plans/documents/materials are approved/accepted, and after copies are at the work site. This phase shall include:

a. A review of each paragraph of applicable specifications, reference codes, and standards.

b. A review of the contract drawings.

c. A check to assure that all materials and/or equipment have been tested, submitted, and approved.

d. Review of provisions that have been made to provide required control inspection and testing.

e. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.

f. A physical examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.

g. A review of the appropriate activity hazard analysis to assure safety requirements are met.

h. Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.

i. A check to ensure that the portion of the plan for the work to be performed has been accepted by the Contracting Officer.

j. Discussion of the initial control phase.

k. The Contractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

3.6.2 Initial Phase

This phase shall be accomplished at the beginning of a definable feature of work. The following shall be accomplished:

a. A check of work to ensure that it is in full compliance with contract requirements.

b. Verify adequacy of controls to ensure full contract compliance. Verify required control inspection and testing.

c. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards.

d. Resolve all differences.

e. Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.

f. The Government shall be notified at least 24 hours in advance of beginning the initial phase.

g. The initial phase should be repeated for each new crew to work onsite, or any time acceptable specified quality standards are not being met.

3.6.3 Follow-up Phase

Daily checks shall be performed to assure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the particular feature of work. The checks shall be made a matter of record in the CQC documentation. Final follow-up checks shall be conducted and all deficiencies corrected prior to the start of additional features of work which may be affected by the deficient work. The Contractor shall not build upon nor conceal non-conforming work.

3.6.4 Additional Preparatory and Initial Phases

Additional preparatory and initial phases shall be conducted on the same definable features of work if: the quality of on-going work is unacceptable; if there are changes in the applicable CQC staff, onsite production supervision or work crew; if work on a definable feature is resumed after a substantial period of inactivity; or if other problems develop.

3.7 TESTS

3.7.1 Testing Procedure

The Contractor shall perform specified or required tests to verify that control measures are adequate to provide a product which conforms to contract requirements. Upon request, the Contractor shall furnish to the Government duplicate samples of test specimens for possible testing by the Government. Testing includes operation and/or acceptance tests when specified. The Contractor shall procure the services of a Corps of Engineers approved testing laboratory or establish an approved testing laboratory at the project site. The Contractor shall perform the following activities and record and provide the following data:

a. Verify that testing procedures comply with contract requirements.

b. Verify that facilities and testing equipment are available and comply with testing standards.

c. Check test instrument calibration data against certified standards.

d. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.

e. Results of all tests taken, both passing and failing tests, shall be recorded on the CQC report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test shall be given. If approved by the Contracting Officer, actual test reports may be submitted later with a reference to the test number and date taken. An information copy of tests performed by an offsite or commercial test facility shall be provided directly to the Contracting Officer. Failure to submit timely test reports as stated may result in nonpayment for related work performed and disapproval of the test facility for this contract.

3.7.2 Testing Laboratories

3.7.2.1 Capability Check

The Government reserves the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the contract specifications and to check the laboratory technician's testing procedures and techniques. Laboratories utilized for testing soils, concrete, asphalt, and steel shall meet criteria detailed in ASTM D 3740 and ASTM E 329.

3.7.2.2 Capability Recheck

If the selected laboratory fails the capability check, the Contractor will be assessed a charge of $3500 to reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

3.7.3 Onsite Laboratory

The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests, and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

3.7.4 Furnishing or Transportation of Samples for Testing

Costs incidental to the transportation of samples or materials shall be borne by the Contractor. Samples of materials for test verification and acceptance testing by the Government shall be delivered to the Corps of Engineers Division Laboratory, f.o.b., at the following address:

For delivery by mail: USACE Research and Development Center
ATTN: Joe Tom, CEERD-SC-E
3909 Halls Ferry Road
Vicksburg, MS 39180-6199

For other deliveries: Same as Above

Coordination for each specific test, exact delivery location, and dates will be made through the Area Office.

3.8 COMPLETION INSPECTION

3.8.1 Punch-Out Inspection

Near the end of the work, or any increment of the work established by a time stated in the Special Clause, "Commencement, Prosecution, and Completion of Work", or by the specifications, the CQC Manager shall conduct an inspection of the work. A punch list of items which do not conform to the approved drawings and specifications shall be prepared and included in the CQC documentation, as required by paragraph DOCUMENTATION. The list of deficiencies shall include the estimated date by which the deficiencies will be corrected. The CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected. Once this is accomplished, the Contractor shall notify the Government that the facility is ready for the Government Pre-Final inspection.

3.8.2 Pre-Final Inspection

The Government will perform the pre-final inspection to verify that the facility is complete and ready to be occupied. A Government Pre-Final Punch List may be developed as a result of this inspection. The Contractor's CQC System Manager shall ensure that all items on this list have been corrected before notifying the Government, so that a Final inspection with the customer can be scheduled. Any items noted on the Pre-Final inspection shall be corrected in a timely manner. These inspections and any deficiency corrections required by this paragraph shall be accomplished within the time slated for completion of the entire work or any particular increment of the work if the project is divided into increments by separate completion dates.

3.8.3 Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, plus the superintendent or other primary management person, and the Contracting Officer's Representative shall be in attendance at the final acceptance inspection. Additional Government personnel including, but not limited to, those from Base/Post Civil Facility Engineer user groups, and major commands may also be in attendance. The final acceptance inspection will be formally scheduled by the Contracting Officer based upon results of the Pre-Final inspection. Notice shall be given to the Contracting Officer at least 14 days prior to the final acceptance inspection and shall include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work performed under the contract, will be complete and acceptable by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the contract clause titled "Inspection of Construction".

3.9 DOCUMENTATION

The Contractor shall maintain current records providing factual evidence that required quality control activities and/or tests have been performed. These records shall include the work of subcontractors and suppliers and shall be on an acceptable form that includes, as a minimum, the following information:

a. Contractor/subcontractor and their area of responsibility.

b. Operating plant/equipment with hours worked, idle, or down for repair.

c. Work performed each day, giving location, description, and by whom.

d. Test and/or control activities performed with results and references to specifications/drawings requirements. The control phase shall be identified (Preparatory, Initial, Follow-up). List of

deficiencies noted, along with corrective action.

e. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements.

f. Submittals and deliverables reviewed, with contract reference, by whom, and action taken.

g. Offsite surveillance activities, including actions taken.

h. Job safety evaluations stating what was checked, results, and instructions or corrective actions.

i. Instructions given/received and conflicts in plans and/or specifications.

j. Contractor's verification statement.

These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. The original and one copy of these records in report form shall be furnished to the Government daily within 48 hours after the date covered by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, one report shall be prepared and submitted for every 7 days of no work and on the last day of a no work period. All calendar days shall be accounted for throughout the life of the contract. The first report following a day of no work shall be for that day only. Reports shall be signed and dated by the CQC System Manager. The report from the CQC System Manager shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel.

3.10 SAMPLE FORMS

Sample forms enclosed at the end of this section.

3.11 NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

-- End of Section --

DACW41-02-0005

SECTION 01530

SAFETY SIGN
07/01

PART 1 GENERAL

1.1 GENERAL

The items furnished under this section shall be maintained in good condition throughout the construction period. The items furnished shall remain the property of the Contractor and shall be removed from the site upon completion of the work.

PART 2 PRODUCTS

2.1 SAFETY SIGN

One safety sign shall be constructed in accordance with the attached standard drawing.

PART 3 EXECUTION

3.1 INSTALLATION OF SAFETY SIGN

One safety sign shall be provided at the directed location.

-- End of Section --

SAFETY PERFORMANCE SIGN

Each contractor's safety record is to be posted on Corps managed or supervised construction projects and mounted with the construction project identification sign.

The graphic format, color, size and typefaces used on the sign are to be reproduced exactly as specified below. The title with First Aid logo in the top section of the sign and the performance record captions are standard for all signs of the type. Legend Groups 2 and 3 below identify the project and the contractor and are to be placed on the sign as shown.

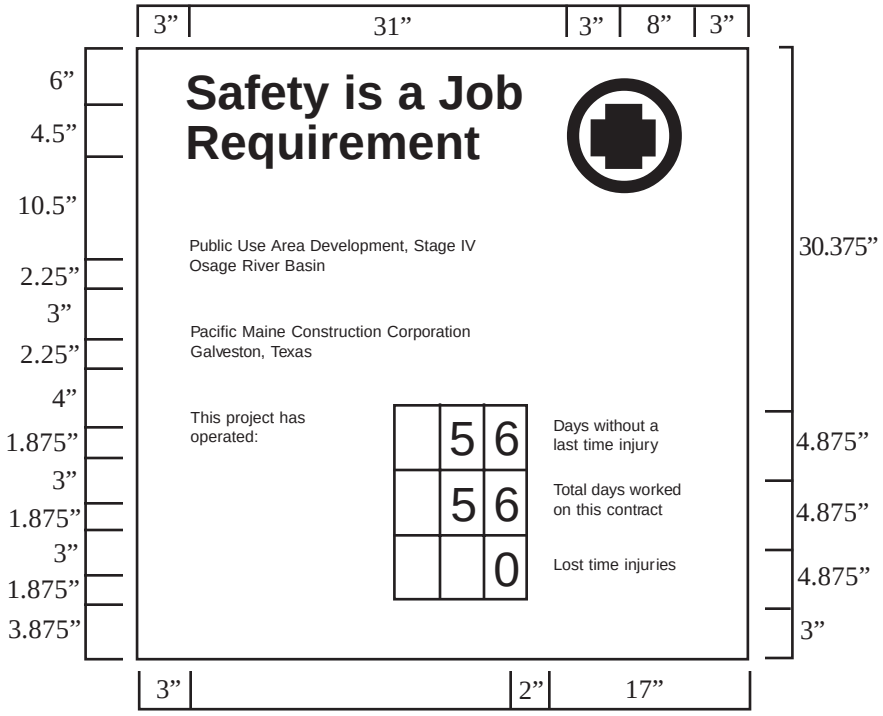
Safety record numbers are mounted on individual metal plates and are screw mounted to the background to allow for daily revisions to posted safety performance record.

Legend Group 1: Standard two-line title "Safety is a Job requirement" with (8 od.) Safety Green First Aid logo.
Color: to match PMS 347
Typeface: 3" Helvetica Bold
Color: Black

Legend Group 2: One to two-line project title legend describes the work being done under this contract and name of host project.
Color: Black
Typeface: 1.5" Helvetica Regular
Maximum line length: 42"

Legend Group 3: One to two-line identification; name of prime contractor and city, state address.
Color: Black
Typeface: 1.5" Helvetica Regular
Maximum line length: 42"

Legend Group 4: Standard safety record captions as shown.
Color: Black
Typeface: 12.5" Helvetica Regular



Sign Type	Legend Size	Panel Size	Post Size	Specification Code	Mounting Height	Color Bkg/Lgd
CID-02	Various	4' X 4'	4" X 4"	HDO-3	48"	WH/BK - GR

Replaceable numbers are to be mounted on white .060 aluminum plates and screw-mounted to background.
Color: Black
Typeface: 3" Helvetica Regular
Plate size: 2.5" X 5"

All typography is flush left and rag right. Upper and lower case with initial capitals only as shown. Letter - and word - spacing to follow Corps standards.

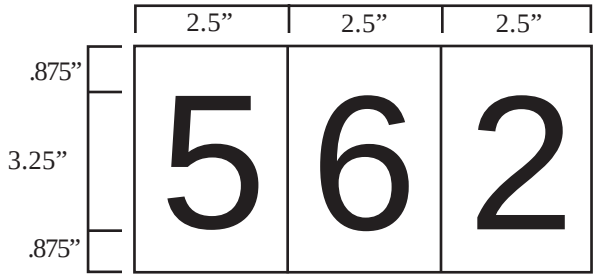


Fig. 2

All Construction Project Identication signs and Safety Performance signs are to be fabricated and installed as described below. The signs are to be erected at a location designated by the contracting officer and shall conform to size, format. and typographic standards.

The sign panels are to be fabricated from .75” High Density Overlay Plywood.

Sign graphics to be prepared on a white non-reflective vinyl film with positionable adhesive backing.

All graphics except for the Communications Red background with Corps signature on the project sign are to die-cut or computer cut nonreflective vinyl, pre-spaced legends prepared in the sizes and typefaces specified and applied to the background panel following the graphic formats shown.

The 2’ x 4’ Communications Red panel (to match PMS-032) with full Corps signature (reverse version) is to be screen printed on the white background identification of the District / Division may be applied under the signature with white cut vinyl letters prepared to Corps standards

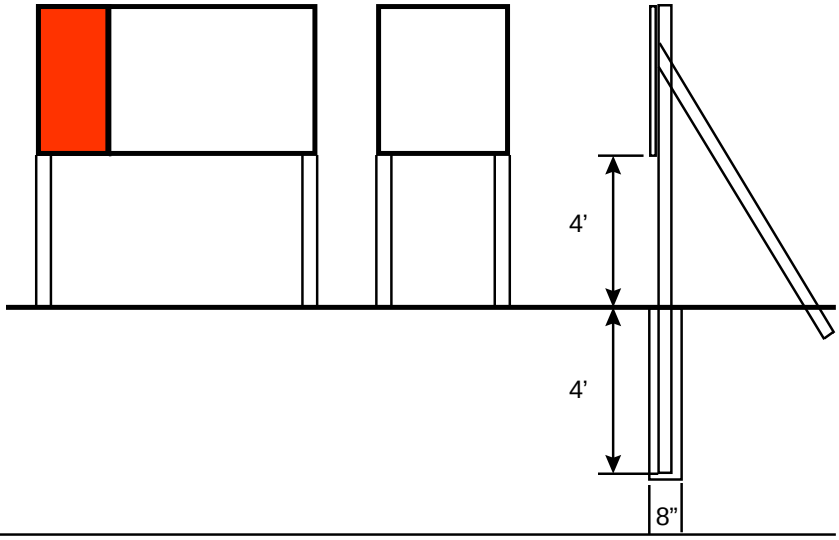
Drill and insert six (6) .375 T-nuts from the front face of the HDO sign panel. Position holes as shown. Flange of T-nut to be flush with sign face

Apply Graphic panel to prepared HDO plywood panel following manufactures instructions

Sign uprights to be structural grade 4” x 4” treated Douglas Fir or Southern Yellow Pine. No 1 or better. Post to be 12’ long Drill six (6) .375” mounting holes in uprights to align with T-nuts in sign panel. Countersink (5”) back of hole to accept socket head cap screw (4” x .375”).

Assemble sign panel and uprights. Imbed assembled sign panel and uprights in 4’ hole. Local soil conditions and/or wind loading may require bolting additional 2” x 4” structs on inside face of uprights to reinforce installation shown.

Shown below the mounting diagram is a panel layout grid with spaces provided for project information. Photocopy this page and use as a worksheet when pre-paring sign Legend orders.



Construction Project Sign
Legend Group 1

1 _____
2 _____

Legend Group 2 Division/District Names

1 _____
2 _____

Legend Group 3 Project Title

1 _____
2 _____
3 _____

Legend Group 4 Facility Name

1 _____
2 _____

Legend Group 5a: Contractor/A&E

1 _____
2 _____
3 _____
4 _____
5 _____

Legend Group 5b: Contractor/A&E

1 _____
2 _____
3 _____
4 _____
5 _____

Safety Performance Sign
Legend Group 1: Project Title

1 _____
2 _____

Legend Group 2: Contractor/A&E

1 _____
2 _____

FABRICATION AND MOUNTING GUIDELINES

SECTION 02230

CLEARING AND GRUBBING
06/97

PART 1 GENERAL

1.1 DEFINITIONS

1.1.1 Clearing

Clearing shall consist of the felling, trimming, and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including down timber, snags, brush, and rubbish occurring in the areas to be cleared.

1.1.2 Grubbing

Grubbing shall consist of the removal and disposal of stumps, roots larger than 2 inches in diameter, and matted roots from the designated grubbing areas.

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-18 Records

Materials Other Than Salable Timber; FIO

Written permission to dispose of such products on private property shall be filed with the Contracting Officer.

1.3 MEASUREMENT

1.3.1 Measured Clearing and Grubbing

Clearing and grubbing shall be measured as a lump sum item.

1.4 PAYMENT

1.4.1 Paid Clearing and Grubbing

Payment will be made at the contract unit price for clearing and grubbing, and this price shall constitute full compensation for all labor, equipment, tools, and incidentals necessary to complete the work specified herein.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 CLEARING

Trees, stumps, roots, brush, and other vegetation in areas to be cleared shall be cut off flush with or below the original ground surface, except such trees and vegetation as may be indicated or directed to be left standing. Trees designated to be left standing within the cleared areas shall be trimmed of dead branches 1-1/2 inches or more in diameter and shall be trimmed of all branches the heights indicated or directed. Limbs and branches to be trimmed shall be neatly cut close to the bole of the tree or main branches. Cuts more than 1-1/2 inches in diameter shall be painted with an approved tree-wound paint. Trees and vegetation to be left standing shall be protected from damage incident to clearing, grubbing, and construction operations by the erection of barriers or by such other means as the circumstances require. Clearing shall also include the removal and disposal of structures that obtrude, encroach upon, or otherwise obstruct the work.

3.2 GRUBBING

Material to be grubbed, together with logs and other organic or metallic debris not suitable for foundation purposes, shall be removed to a depth of not less than 18 inches below the original surface level of the ground in areas indicated to be grubbed and in areas indicated as construction areas under this contract, such as areas for buildings, and areas to be paved. Depressions made by grubbing shall be filled with suitable material and compacted to make the surface conform with the original adjacent surface of the ground.

3.3 DISPOSAL OF MATERIALS

3.4.1 Salable Timber

Salable timber remaining within the areas to be cleared on or after the date of award of this contract may be disposed of as the Contractor sees fit, as long as such merchantable timber is either removed from the rights-of-way or is satisfactorily disposed of in accordance with SECTION 02331, LEVEE CONSTRUCTION, paragraph DISPOSITION OF CLEARED, GRUBBED, AND STRIPPED MATERIAL DISPOSITION OF EXCAVATED MATERIAL and the Contractor complies with all applicable State and local regulations and laws.

3.3.1 Materials Other Than Salable Timber

Logs, stumps, roots, brush, rotten wood, and other refuse from the clearing and grubbing operations, except for salable timber, shall be disposed of within the project area as specified by the Contracting Officer, except when otherwise directed in writing. Such directive will state the conditions covering

the disposal of such products and will also state the areas in which they may be placed. Refuse to be burned shall be burned at specified locations and in a manner to prevent damage to existing structures and appurtenances, construction in progress, trees, and other vegetation. The Contractor shall be responsible for compliance with all Federal and State laws and regulations and with reasonable practice relative to the building of fires. Burning or other disposal of refuse and debris and any accidental loss or damage attendant thereto shall be the Contractor's responsibility.

-- End of Section --

SECTION 02316

EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS
11/97

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 1557	(1998) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu. m.))
ASTM D 2487	(1998) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2922	(1996) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(1988; R1996el) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)

1.2 MEASUREMENT AND PAYMENT

Measurement and payment shall be based on completed work performed in accordance with the drawings and specifications.

1.3 DEGREE OF COMPACTION

Degree of compaction shall be expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 698.

1.4 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-09 Reports

Field Density Tests; GA. Testing of Backfill Materials; GA.

Copies of all laboratory and field test reports shall be furnished to the Contracting Officer within 24 hours of the completion of the test.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Satisfactory Materials

Satisfactory materials shall comprise any materials classified by ASTM D 2487 as GW, GP, GM, GP-GM, GW-GM, GC, GP-GC, GM-GC, SW, SP, CL, CL-ML, or CH.

2.1.2 Unsatisfactory Materials

Materials which do not comply with the requirements for satisfactory materials are unsatisfactory. Unsatisfactory materials also include man-made fills, trash, refuse, or backfills from previous construction. Unsatisfactory material also includes material classified as satisfactory which contains root and other organic matter, frozen material, and stones larger than 6 inches. The Contracting Officer shall be notified of any contaminated materials.

2.1.3 Cohesionless and Cohesive Materials

Cohesionless materials shall include materials classified in ASTM D 2487 as GW, GP, SW, and SP. Cohesive materials shall include materials classified as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM shall be identified as cohesionless only when the fines are nonplastic.

2.1.4 Rock

Rock shall consist of boulders measuring 1/2 cubic yard or more and materials that cannot be removed without systematic drilling and blasting such as rock material in ledges, bedded deposits, unstratified masses and conglomerate deposits, and below ground concrete or masonry structures, exceeding 1/2 cubic yard in volume, except that pavements shall not be considered as rock.

2.1.5 Unyielding Material

Unyielding material shall consist of rock and gravelly soils with stones greater than 6 inches in any dimension or as defined by the pipe manufacturer, whichever is smaller.

2.1.6 Unstable Material

Unstable material shall consist of materials too wet to properly support the utility pipe, conduit, or

appurtenant structure.

2.1.7 Select Granular Material

Select granular material shall consist of well-graded sand, gravel, crushed gravel, crushed stone or crushed slag composed of hard, tough and durable particles, and shall contain not more than 10 percent by weight of material passing a No. 200 mesh sieve and no less than 95 percent by weight passing the l inch sieve. The maximum allowable aggregate size shall be 2 inches,or the maximum size recommended by the pipe manufacturer, whichever is smaller.

2.1.8 Initial Backfill Material

Initial backfill shall consist of select granular material or satisfactory materials free from rocks 6 inches or larger in any dimension or free from rocks of such size as recommended by the pipe manufacturer, whichever is smaller. When the pipe is coated or wrapped for corrosion protection, the initial backfill material shall be free of stones larger than 4 inches in any dimension or as recommended by the pipe manufacturer, whichever is smaller.

PART 3 EXECUTION

3.1 EXCAVATION

Excavation shall be performed to the lines and grades indicated. During excavation, material satisfactory for backfilling shall be stockpiled in an orderly manner at a distance from the banks of the trench equal to 1/2 the depth of the excavation, but in no instance closer than 2 feet. Excavated material not required or not satisfactory for backfill shall be removed from the site or shall be disposed of by placement in the designated areas as shown on the plans. Grading shall be done as may be necessary to prevent surface water from flowing into the excavation, and any water accumulating shall be removed to maintain the stability of the bottom and sides of the excavation. Unauthorized overexcavation shall be backfilled in accordance with paragraph BACKFILLING AND COMPACTION at no additional cost to the Government.

3.1.1 Trench Excavation Requirements

The trench shall be excavated as recommended by the manufacturer of the pipe to be installed. Trench walls below the top of the pipe shall be sloped, or made vertical, and of such width as recommended in the manufacturer's installation manual. Where no manufacturer's installation manual is available, trench walls shall be made vertical. Trench walls more than 3 feet high shall be shored, cut back to a stable slope, or provided with equivalent means of protection for employees who may be exposed to moving ground or cave in. Vertical trench walls more than 3 feet high shall be shored. Trench walls which are cut back shall be excavated to at least the angle of repose of the soil. Special attention shall be given to slopes which may be adversely affected by weather or moisture content. The trench width below the top of pipe shall not exceed 24 inches plus pipe outside diameter (O.D.) for pipes of less than 24 inches inside diameter and shall not exceed 36 inches plus pipe outside diameter for sizes larger than 24 inches inside diameter. Where recommended trench widths are exceeded, redesign, stronger pipe, or special installation procedures shall be utilized by the Contractor. The cost of redesign, stronger pipe, or special installation procedures shall be borne by the Contractor without any additional cost to the Government.

3.1.1.1 Bottom Preparation

The bottoms of trenches shall be accurately graded to provide uniform bearing and support for the bottom quadrant of each section of the pipe. Bell holes shall be excavated to the necessary size at each joint or coupling to eliminate point bearing. Stones of 6 inches or greater in any dimension, or as recommended by the pipe manufacturer, whichever is smaller, shall be removed to avoid point bearing.

3.1.1.2 Removal of Unyielding Material

Where unyielding material is encountered in the bottom of the trench, such material shall be removed 6 inches below the required grade and replaced with suitable materials as provided in paragraph BACKFILLING AND COMPACTION.

3.1.1.3 Removal of Unstable Material

Where unstable material is encountered in the bottom of the trench, such material shall be removed to the depth directed and replaced to the proper grade with select granular material as provided in paragraph BACKFILLING AND COMPACTION. When removal of unstable material is required due to the Contractor's fault or neglect in performing the work, the resulting material shall be excavated and replaced by the Contractor without additional cost to the Government.

3.1.1.4 Excavation for Appurtenances

Excavation for manholes, catch-basins, inlets, or similar structures shall be of sufficient size to permit the placement and removal of forms for the full length and width of structure footings and foundations as shown. Rock shall be cleaned of loose debris and cut to a firm surface either level, stepped, or serrated, as shown or as directed. Loose disintegrated rock and thin strata shall be removed. Removal of unstable material shall be as specified above. When concrete or masonry is to be placed in an excavated area, special care shall be taken not to disturb the bottom of the excavation. Excavation to the final grade level shall not be made until just before the concrete or masonry is to be placed.

3.1.1.5 Jacking, Boring, and Tunneling

Unless otherwise indicated, excavation shall be by open cut except that sections of a trench may be jacked, bored, or tunneled if, in the opinion of the Contracting Officer, the pipe, cable, or duct can be safely and properly installed and backfill can be properly compacted in such sections.

3.1.2 Stockpiles

Stockpiles of satisfactory and wasted materials shall be placed and graded as specified. Stockpiles

shall be kept in a neat and well drained condition, giving due consideration to drainage at all times. The ground surface at stockpile locations shall be cleared, grubbed, and sealed by rubber-tired equipment, excavated satisfactory and unsatisfactory materials shall be separately stockpiled. Stockpiles of satisfactory materials shall be protected from contamination which may destroy the quality and fitness of the stockpiled material. If the Contractor fails to protect the stockpiles, and any material becomes unsatisfactory, such material shall be removed and replaced with satisfactory material from approved sources at no additional cost to the Government. Locations of stockpiles of satisfactory materials shall be subject to prior approval of the Contracting Officer.

3.2 BACKFILLING AND COMPACTION

Backfill material shall consist of satisfactory material, select granular material, or initial backfill material as required. Backfill shall be placed in layers not exceeding 6 inches loose thickness for compaction by hand operated machine compactors, and 8 inches loose thickness for other than hand operated machines, unless otherwise specified. Each layer shall be compacted to at least 95 percent maximum density for cohesionless soils and cohesive soils, unless otherwise specified.

3.2.1 Trench Backfill

Trenches shall be backfilled to the grade shown. The trench shall be backfilled to 2 feet above the top of pipe prior to performing the required pressure tests. The joints and couplings shall be left uncovered during the pressure test.

3.2.1.1 Replacement of Unyielding Material

Unyielding material removed from the bottom of the trench shall be replaced with select granular material or initial backfill material.

3.2.1.2 Replacement of Unstable Material

Unstable material removed from the bottom of the trench or excavation shall be replaced with select granular material placed in layers not exceeding 6 inches loose thickness.

3.2.1.3 Bedding and Initial Backfill

Bedding shall be of the type and thickness shown. Initial backfill material shall be placed and compacted with approved tampers to a height of at least one foot above the utility pipe or conduit. The backfill shall be brought up evenly on both sides of the pipe for the full length of the pipe. Care shall be taken to ensure thorough compaction of the fill under the haunches of the pipe.

3.2.1.4 Final Backfill

The remainder of the trench, except for special materials for roadways, railroads and airfields, shall be filled with satisfactory material. Backfill material shall be placed and compacted as follows:

Backfill shall be deposited in layers of a maximum of 12 inch loose thickness, and compacted to 95 percent maximum density. Compaction by water flooding or jetting will not be permitted. This requirement shall also apply to all other areas not specifically designated above.

3.2.2 Backfill for Appurtenances

After the manhole, catchbasin, inlet, or similar structure has been constructed and the concrete has been allowed to cure for 7 days, backfill shall be placed in such a manner that the structure will not be damaged by the shock of falling earth. The backfill material shall be deposited and compacted as specified for final backfill, and shall be brought up evenly on all sides of the structure to prevent eccentric loading and excessive stress.

3.3 SPECIAL REQUIREMENTS

3.4 TESTING

Testing shall be the responsibility of the Contractor and shall be performed at no additional cost to the Government.

3.4.1 Testing Facilities

Tests shall be performed by an approved commercial testing laboratory or may be tested by facilities furnished by the Contractor. No work requiring testing will be permitted until the facilities have been approved by the Contracting Officer.

3.4.2 Testing of Backfill Materials

Classification of backfill materials shall be determined in accordance with ASTM D 2487 and the moisture-density relations of soils shall be determined in accordance with ASTM D 1557. A minimum of one soil classification and one moisture-density relation test shall be performed on each different type of material used for bedding and backfill.

3.4.3 Field Density Tests

Tests shall be performed in sufficient numbers to ensure that the specified density is being obtained. A minimum of one field density test per lift of backfill for every 20 feet of installation shall be performed. One moisture density relationship shall be determined for every 1500 cubic yards of material used. Field in-place density shall be determined in accordance with ASTM D 2922. When ASTM D 2922 is used, the calibration curves shall be checked and adjusted using the sand cone method as described in paragraph Calibration of the ASTM publication. ASTM D 2922 results in a wet unit weight of soil and when using this method, ASTM D 3017shall be used to determine the moisture content of the soil. The calibration curves furnished with the moisture gauges shall be checked along with density calibration checks as described in ASTM D 3017. The calibration checks of both the density and moisture gauges shall be made at the beginning of a job, on each different type of material encountered, at intervals as directed by the Contracting Officer. Copies of calibration curves, results of calibration tests, and

field and laboratory density tests shall be furnished to the Contracting Officer. Trenches improperly compacted shall be reopened to the depth directed, then refilled and compacted to the density specified at no additional cost to the Government.

3.4.4 Displacement

After other required tests have been performed and the trench backfill compacted to 2 feet above the top of the pipe, the pipe shall be inspected to determine whether significant displacement has occurred. This inspection shall be conducted in the presence of the Contracting Officer. Pipe sizes larger than 36 inches shall be entered and examined, while smaller diameter pipe shall be inspected by shining a light or laser between manholes or manhole locations, or by the use of television cameras passed through the pipe. If, in the judgement of the Contracting Officer, the interior of the pipe shows poor alignment or any other defects that would cause improper functioning of the system, the defects shall be remedied as directed at no additional cost to the Government.

-- End of Section --

02331

LEVEE CONSTRUCTION
08/99

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 422	(1963; R 1998) Particle-Size Analysis of Soils
ASTM D 698	(1991; R 1998) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu. m.))
ASTM D 1556	(1990; R 1996) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 2167	(1994) Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D 2216	(1998) Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
ASTM D 2487	(1998) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2922	(1996) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 2937	(1994) Density of Soil in Place by the Drive-Cylinder Method
ASTM D 3017	(1996) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
ASTM D 4253	(1993; R 1996) Maximum Index Density and Unit Weight of Soils Using a Vibratory Table
ASTM D 4254	(1991; R 1996) Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density
ASTM D 4318	(1998) Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D 4643	(1993) Determination of Water (Moisture) Content of Soil by the Microwave Oven Method
ASTM D 5195	(1991; R 1996) Density of Soil and Rock In-Place Below the Surface by Nuclear Methods

ENGINEERING MANUALS (EM)

EM 385-1-1	(1996) U.S. Army Corps of Engineers Safety and Health Requirements Manual

1.2 UNIT PRICES

1.2.1 Clearing, Grubbing, and Stripping

1.2.1.1 Payment

Payment will be made for clearing, grubbing and stripping at the contract unit price for clearing, grubbing and stripping. This price shall constitute full compensation for all equipment, labor, materials and incidentals necessary to complete the work specified herein. Payment for refilling of holes resulting from grubbing will be included in the contract unit price for clearing, grubbing and stripping. No separate or direct payment will be made for stockpiling and disposition of stripped materials. All costs in connection therewith will be considered as a subsidiary obligation of the Contractor. If regrowth of vegetation or trees occurs after clearing and grubbing and before placement of embankment, and the Contractor is required to clear and grub again prior to embankment construction, no payment will be made for this additional clearing and grubbing.

1.2.1.2 Measurement

Refilling of grubbing holes will not be measured for payment.

1.2.1.3 Unit of Measure

Unit of measure: lump sum.

1.2.2 Excavation

1.2.2.1 Payment

Payment will be made for Excavation at the contract unit price which includes full compensation for all equipment, labor, materials, and incidentals necessary to complete the work specified. No separate payment will be made for stockpiling.

1.2.2.2 Measurement

Measurement shall be based on completed work performed in accordance with the contract drawings and specifications.

1.2.2.3 Unit of Measure

Unit of Measure: cubic yards.

1.2.3 Fill Material

1.2.3.1 Payment For Embankment Fill

Payment will be made for material placed as required in embankments, backfills and ramps, and including additional material placed by reason of foundation settlement and by reason of soft material in the foundation being forced outward from the section during construction, for Embankment Material Type Compacted Fill,. Payment shall constitute full compensation for furnishing all plant, labor, equipment and material, and performing all operations necessary for foundation preparation and placing and compacting the material, materials testing, and moisture control. This payment is in addition to any payment for excavating and transporting of the material as required in paragraph 1.2.2.1, Excavation Payment.

1.2.3.2 Measurement of Fill Material

a. Fill materials specified for embankment will be measured for payment by the cubic yard, and quantities will be determined by the average end area method. The basis for measurement will be cross sections of the areas to be filled taken after clearing, grubbing, and stripping operations and the actual cross sections of the embankments constructed within the specified tolerance plus additional fill placed as the result of displacement or settlement of foundation material. Cross sections shall be performed at significant breaks in grade except that the maximum distance between cross sections shall not exceed 200 feet. Embankments not constructed to design grade and section including allowable tolerance as indicated on the Contractor's compliance survey will not be accepted.

b. The basis for measurement of fill placed by reason of soft material in the foundation being forced outward from the section will be a survey of the area taken prior to fill placement and a second survey of the same area after completion of fill placement. The cross sections will extend 100 feet beyond the toes of the fills.

1.2.3.3 Unit of Measure

Unit of measure: cubic yards.

1.2.4 Settlement Monuments

No measurement or separate payment will be made for furnishing and installing settlement monuments as shown on the contract drawings. Payment for these monuments is considered subsidiary to all other earthwork items.

1.3 SYSTEM DESCRIPTION

The work covered by this section consists of furnishing all equipment, labor, materials, and incidentals, and performing all operations necessary for the clearing, grubbing, and stripping of the areas specified herein or indicated on the drawings, and for the removal and disposal of cleared, grubbed, and stripped materials, and refilling of holes resulting from grubbing; excavation of borrow areas and existing levees, and for all other excavations incidental to the construction of levees, channels, ditches, structures, and ponding areas as specified and shown; foundation preparation and the construction of levee embankments, including new levee, enlargement of existing levee, backfill of inspection trenches, cutoff trenches, berms, road crossings, backfill at drainage structures, and other incidental earthwork as may be necessary to complete the levee as specified herein and as shown on the drawings. All work under this section shall comply with the requirements of EM 385-1-1.

1.4 DEFINITIONS

1.4.1 Clearing

Clearing shall consist of the removal and satisfactory disposal of all above ground and below ground trees, downed timber, snags, slash, brush, garbage, trash, debris, fencing, and other items occurring in the designated areas to be cleared.

1.4.2 Grubbing

Grubbing shall consist of the removal and satisfactory disposal of stumps, roots larger than 2 inches in diameter, and matted roots from the designated grubbing areas. Grubbing also includes filling of holes from the grubbing operation.

1.4.3 Stripping

Stripping shall consist of the removal and satisfactory disposal of crops, weeds, grass, and other vegetative materials to the ground surface and topsoil to a depth of 8 inches.

1.4.4 Satisfactory Materials

Satisfactory materials shall consist of materials classified in accordance with ASTM D 2487 as CL, CH, CL-ML, ML, SC, SP, SW, free from: roots and other organic matter; contamination from hazardous, toxic or radiological substances; trash, debris; and frozen materials. Not all satisfactory materials can be used in levee. Only the satisfactory materials stated above, meeting the additional or modified requirements of paragraph TYPES OF FILL MATERIALS, can be used for levee construction.

1.4.5 Unsatisfactory Materials

Unsatisfactory materials shall not be used in any levee or other required fill. Unsatisfactory materials includes all other materials that are not defined above as satisfactory materials.

1.4.6 Embankment

The terms "levee" or "embankment" as used in these specifications are defined as the earth and rock fill portions of the levee structure or other fills related to the levee structure, including keyway trench and includes all types of earth fill and filter materials for the levee and keyway trench, and all other fills within the limits of the levee .

1.4.7 Backfill

Backfill as used in this section is defined as that fill material which cannot be placed around or adjacent to a structure until the structure is completed or until a specified time interval has elapsed after completion.

1.4.8 Excavation

Excavation shall consist of removal of material to the lines and grades shown on the drawings, or as otherwise directed or approved by the Contracting Officer and as described in paragraph EXCAVATION in PART 3 EXECUTION.

1.4.9 Classification of Soils

Materials used to construct the embankments and for backfills shall be classified in accordance with ASTM D 2487 (Unified Soil Classification System).

1.4.9.1 Cohesionless and Cohesive Materials

Cohesionless materials shall include materials classified in ASTM D 2487 as GW, GP, SW, and SP. Cohesive materials include materials classified as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM will be identified as cohesionless only when the fines are nonplastic.

1.4.10 Degree of Compaction

1.4.10.1 Cohesive Material

Degree of compaction shall be expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 698, abbreviated hereinafter as percent laboratory maximum density.

1.4.10.2 Cohesionless Material

Degree of compaction shall be expressed as a percentage of the relative density in accordance with ASTM D 4253 and ASTM D 4254.

1.5 GENERAL CONDITIONS

1.5.1 Lines and Grades

The embankment and backfill shall be constructed to the lines, grades, and cross sections indicated on the drawings, unless otherwise directed by the Contracting Officer. The Government reserves the right to increase or decrease the foundation widths and embankment slopes or to make such other changes in the embankment or backfill sections as may be deemed necessary to produce a safe structure. Changes in quantities resulting from such revisions will not constitute justification for change in contract unit prices, except as provided for in the Variations in Estimated Quantities Clause. Increases in height of section, made to compensate for settlement or consolidation of the embankment material subsequent to the completion of the embankment, will not exceed 5 percent of the height above the foundation at the levee centerline indicated. The end slopes and side slopes of partial fill sections shall not be steeper than one vertical on 3 horizontal, unless otherwise shown on the drawings.

1.5.2 Conduct of the Work

The Contractor shall maintain and protect the embankment and backfill in a satisfactory condition at all times until final completion and acceptance of all work under the Contract. If, in the opinion of the Contracting Officer, the hauling equipment causes horizontal shear planes or slicken sides, rutting, quaking, heaving, cracking, or excessive deformation of the embankment or backfill, the Contractor shall limit the type, load, or travel speed of the hauling equipment on the embankment or backfill. The Contractor may be required to remove, at his own expense, any embankment material placed outside of prescribed slope lines. Any approved embankment or backfill material which is lost in transit or rendered unsuitable after being placed in the embankment or backfill and before final acceptance of the work shall be replaced by the Contractor in a satisfactory manner and no additional payment will be made therefor. The Contractor shall excavate and remove from the embankment or backfill any material which is unsatisfactory and shall also dispose of such material and refill the excavated area as directed, all at no cost to the Government.

1.5.3 Materials

Materials for embankment and backfill construction will be obtained from the borrow sources. Materials obtained from required excavation which meet or which can be processed to meet the requirements for each embankment material, or any other material required for this project, as specified herein, may be utilized in the embankment or as backfill. All roots, limbs, and wood fragments shall be removed from embankment materials. Materials containing sod, other organic or perishable material, trash, debris, and frozen materials shall not be used in the embankment. The Contractor shall submit to the Contracting Officer the source or sources from which he intends to obtain materials for embankment construction. If a source is selected other than a commercial quarry or other commercial entity from which earth or rock material will be directly purchased and where the Contractor or his subcontractor will perform the borrow excavation, a written statement will be provided to the Contracting Officer indicating permission to utilize the area. It shall be the responsibility of the Contractor to obtain Federal, State, and local permits which may be required for excavation and reclamation of the borrow area. A copy of the plan and

procedures to be utilized for reclamation shall be furnished to the Contracting Officer. The Contracting Officer will require material samples from any proposed borrow source to be submitted as indicated in paragraph Quality Control.

1.5.4 Haul Roads

Haul roads shall be located and constructed as approved by the Contracting Officer. Prior to the commencement of construction the contractor shall submit for approval a site plan detailing the location of all haul roads within the project limits. Haul roads between the borrow sites and the levee embankment shall be located within the limits approved by the Contracting Officer. The limits of the borrow haul road shall be clearly marked in the field using construction fencing or similar methods approved by the Contracting Officer. Areas on each side of the borrow haul road corridor shall not be disturbed. Haul roads shall be constructed to maintain the intended traffic, be free draining, and be maintained in good condition throughout the contract period. Any haul road which crosses any creek or drainage channel shall be constructed, and maintained by the Contractor so as to not flood either upstream areas by restricting stream flows or flood downstream areas by the release of any stored water in the event that the crossing fails for any cause. Haul roads constructed during the contract duration shall be removed after work is completed and the impacted area restored to its preconstruction conditions. The Contractor shall plow and/or scarify or otherwise loosen all access and haul roads other than existing roads to a minimum of 12 inches deep and the surface shall be left in a smooth condition. All costs associated with these haul roads shall be considered as a subsidiary obligation of the Contractor.

1.5.5 Stockpiling

Any on-site stockpiling of embankment materials shall be in accordance with paragraph Stockpiles, PART 3 EXECUTION. No payment will be made for such stockpiling nor for the reloading and hauling of these materials to their final position.

1.5.6 Slides and Foundation Failures

When sliding occurs in any part of the embankment and backfills prescribed in this section after they have been placed, but prior to final acceptance of all work under the contract, the Contractor shall repair the slide as directed by the Contracting Officer. When the slide is caused through the fault of the Contractor, the repair shall be made at no cost to the Government. When the slide is not the fault of the Contractor, an equitable adjustment in the contract price shall be made pursuant to the Contract Clause CHANGES to cover the cost of the repairs.

1.5.7 Protection of Existing Man-Made Facilities and Natural Features

Embankment construction shall be conducted in such a manner as to avoid damage to trees left standing and trees outside the embankment areas, existing buildings, man-made facilities and natural features, with due regard to the safety of employees and others, and in compliance with EM 385-1-1.

1.5.8 Drainage

The Contractor shall not block or restrict the flow in a natural drain, existing culvert, ditch or channel at any time without obtaining prior written approval from the Contracting Officer. This approval shall not relieve the Contractor from responsibility for any damage caused by his operation. The Contractor shall monitor the stream flow and provide sufficient free discharge areas so that conditions are not worsened upstream or downstream by possible floods during construction. Surface water shall be directed away from excavations and construction sites so as to prevent erosion and undermining of foundations. Diversion ditches, dikes, and grading shall be provided and maintained as necessary during construction. Excavated slopes and backfill surfaces shall be protected to prevent erosion and sloughing. Excavation shall be performed so that the site and the area immediately surrounding the site and affecting operations at the site shall be continually and effectively drained.

1.6 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-08 Statements

Shoring, Sheeting, and Bracing; GA.

Submit a detailed shoring, sheeting and bracing plan 14 days prior to the beginning of any excavation so supported. The plan for shoring, sheeting and bracing shall be prepared and certified by licensed professional engineer. The plan shall include drawings and design computations of the proposed shoring, sheeting, and bracing, and documentation, showing details of the coordination and approval of shoring, sheeting, and bracing by the applicable parties. Approval of the detailed plan shall be obtained from the Contracting Officer prior to starting the work. If necessary, the plan shall be modified as required to meet field conditions, and the modifications shall be approved prior to use.

Excavation; GA.

Submit a written excavation plan 14 days prior to the beginning of any excavation. Approval of the detailed plan shall be obtained from the Contracting Officer prior to starting the work. If necessary, the plan shall be modified as required to meet field conditions, and the modifications shall be approved prior to use.

Borrow Areas; GA.

Submit a written statement to the Government not later than 30 days after receipt of Notice to Proceed indicating the Contractor's intention to use the specified Government-furnished borrow area(s), Contractor-furnished borrow area(s), dredged borrow areas, or a combination of these borrow areas.

Plan of Operations; GA.

Thirty (30) days prior to commencement of haul road construction or placing embankment and backfill which ever is earlier, the contractor shall submit for approval a Plan of Operations for accomplishing all embankment and backfill construction and for the location and construction of haul roads. This plan shall include but not be limited to the Contractor's proposed sequence of construction for embankment and backfill items, and methods and types of equipment to be utilized for all embankment and backfill operations, including transporting, placing, and compaction. This plan shall also include the names and addresses of the commercial testing labs engineering firms which will perform the soil testing and inspection and describe how all required soils testing will be performed.

Embankment and Backfill Materials; GA.

At least 30 days prior to delivery of any Contractor-furnished material to the site of the work, the Contractor shall submit soil classification test results, moisture-density curves, gradation curves, and laboratory results of the required tests of the proposed material.

Filter Materials; GA.

At least 30 days prior to delivery of any Contractor-furnished material to the site of the work, the Contractor shall submit soil classification test results and a gradation curve for each of the proposed filter materials to be used.

Nuclear Density Testing Equipment Operator; GA.

Nuclear density testing equipment shall be used in accordance with ASTM D 2922 and ASTM D 3017. In addition, the following condition shall apply:

a. Prior to using the nuclear density testing equipment on the site, the Contractor shall submit to the Contracting Officer a certification that the operator has completed a training course approved by the nuclear density testing equipment manufacturer, the most recent data sheet from the manufacturer's calibration, and a copy of the most recent statistical check of the standard count precision.

b. The nuclear density testing equipment shall be capable of extending a probe a minimum of 6 inches down into a hole.

SD-09 Reports

Survey Records; GA.

Submit a copy of the records of each compliance survey the next work day following the survey.

SD-18 Records

Contractor-Furnished Rights-of-way for Drainage; FIO.

If private property is to be used for drainage, submit written evidence that the right has been obtained from the property owner for drainage on his property. Written evidence shall consist of an authenticated copy of the easement under which the Contractor acquired the property rights and access thereto, prepared and executed in accordance with applicable State and local requirements.

1.7 REGULATORY REQUIREMENTS

The state statutory and regulatory requirements listed below form a part of this specification to the extent referenced.

1.8 PERMITS

In accordance with Contract Clause PERMITS AND RESPONSIBILITIES, the Contractor shall obtain all necessary permits required for disposal, hauling, erosion control, and burning, and pay all fees associated with permitting and compliance. In addition, the Government has obtained permits for storm water discharge as specified in Section 01356 STORM WATER POLLUTION PREVENTION MEASURES. The Contractor shall comply with the terms of these permits and with the requirements of Sections 01354 ENVIRONMENTAL PROTECTION FOR CIVIL WORKS, Section 01356 STORM WATER POLLUTION PREVENTION MEASURES, and this section.

1.9 PROJECT SITE CONDITIONS

1.9.1 Protection of Cultural and Natural Resources

All work and Contractor operations shall comply with the requirements of Section 01354 ENVIRONMENTAL PROTECTION FOR CIVIL WORKS and with the requirements of this section.

1.9.2 Protection of Existing Man-Made Facilities and Natural Features

Trees within the clearing area shall be felled in such a manner as to avoid damage to trees left standing and trees outside the clearing area, existing buildings, man-made facilities and natural features, with due regard to the safety of employees and others, and in compliance with EM 385-1-1. Excavation shall be conducted in such a manner as to avoid damage to trees left standing and trees outside the clearing and excavation area, existing buildings, man-made facilities and natural features, with due regard to the safety of employees and others, and in compliance with EM 385-1-1. Existing utility lines that are shown on the drawings or the locations of which are made known to the Contractor prior to excavation and that are to be retained shall be protected from damage during excavation. When utility lines that are to be removed are encountered within the area of operations, the Contractor shall notify the applicable utility companies in sufficient time for measures to be taken to prevent interruption of the services.

1.9.3 Historical, Archeological, and Cultural Resources

Historical, archeological, and cultural resources within the Contractor's work limits may exist. If, during construction activities, the Contractor observes items that may have historical or archeological value, such observations shall be reported immediately to the Contracting Officer so that appropriate authorities may be notified and a determination made as to their significance and what, if any, special

disposition of the finds should be made. The Contractor shall cease all activities that may result in the destruction of these resources and shall prevent his employees from trespassing on or otherwise damaging such resources.

1.9.4 Subsurface Data

Subsurface soil boring logs are shown on the drawings. Subsurface investigation reports and samples of materials obtained from subsurface investigations may be examined at the District Office. These data represent subsurface information at the boring locations; however, variations may exist in the subsurface between boring locations. Groundwater levels indicated on the soil boring logs were levels found at the time of exploration. The groundwater table can vary significantly depending on time of year, variation from normal precipitation, and river stage or tide level.

1.10 SALABLE TIMBER

Salable timber remaining within the areas to be cleared on or after the date of award of this contract may be disposed of as the Contractor sees fit, as long as such merchantable timber is either removed from the rights-of-way or is satisfactorily disposed of in accordance with the paragraph DISPOSITION OF CLEARED, GRUBBED, AND STRIPPED MATERIAL DISPOSITION OF EXCAVATED MATERIAL and the Contractor complies with all applicable State and local regulations and laws.

1.11 SEQUENCE OF WORK

1.11.1 Clearing and Grubbing

All clearing and grubbing work shall be completed at least 300 feet in advance of embankment construction. In locations where work on drainage structures is performed prior to embankment construction, all clearing and grubbing shall be completed for the structure at least 100 feet on each side of the structure, measured along the levee centerline and 10 feet perpendicular to the structure. If regrowth of vegetation or trees occurs after clearing and grubbing and before placement of embankment, the Contractor will be required to clear and grub again prior to embankment construction.

1.11.2 Stripping

After inspection and acceptance of cleared and grubbed areas, stripping may proceed. All stripping work shall be completed not more than 1000 feet in advance of embankment construction.

PART 2 PRODUCTS

2.1 HAUL ROAD MATERIALS

2.2 TYPES OF FILL MATERIALS

2.2.1 Compacted Clay Fill Material

This material shall consist of satisfactory clay material classified as lean clay (CL) or fat clay (CH) in accordance with ASTM D 2487.

2.2.2 Gravel Drain Rock

This material shall consist of satisfactory gravel drain rock as specified in Section 02380, STONE, CHANNEL SHORELINE/COASTAL PROTECTION FOR STRUCTURES.

2.2.3 [Enter Appropriate Subpart Title Here]2.2.4 Topsoil

Topsoil consists of organic soil and shall be placed on the levee slopes as shown on the contract drawings and as specified in Paragraph PREPARATION OF FOUNDATION, PARTIAL FILL SURFACES AND ABUTMENTS, PART 3 EXECUTION.

2.2.5 Uncompacted Fill

Material for uncompacted fill shall consist of satisfactory materials classified in accordance with ASTM D 2487.

2.3 MANUFACTURED PRODUCTS

Manufactured Products shall be as specified in Section 02630, STORM-DRAINAGE SYSTEM.

2.4 GROUTS AND DENTAL CONCRETE

Grouts and dental concrete shall be as specified in Section 03301 CAST-IN-PLACE STRUCTURAL CONCRETE FOR CIVIL WORKS.

2.5 SETTLEMENT MONUMENTS

Settlement monuments shall be as shown on the contract drawings.

PART 3 EXECUTION

3.1 CLEARING

Clearing shall be accomplished within the limits of existing ground to receive embankment and structures, beyond and contiguous thereto, existing levees to be degraded, ponding areas, ditches, structures, traverses, channels, riprap, revetment, borrow areas and ramps. Trees, downed timber, snags, slash, brush, garbage, trash, debris, fencing and other items shall be cleared flush with the existing ground surface. Trees and vegetation designated to be left standing or to remain shall be protected from damage from construction operations. Clearing of borrow areas shall be limited to the minimum area required for construction operations.

3.2 GRUBBING

Grubbing shall be accomplished within the limits of existing ground to receive embankment and structures, together with strips 5 feet wide, beyond and contiguous thereto, existing levees to be degraded, ponding areas, ditches, structures, traverses, channels, riprap, revetment, borrow areas and ramps. Grubbing shall be accomplished to a depth of at least 3 feet below the existing ground surface.

3.2.1 Filling of Holes

All holes caused by grubbing operations and removal of pipes and drains, excluding holes in borrow areas, channels and ditches above required grade, shall be filled with satisfactory material as determined by the Contracting Officer. This material shall be placed in 6 inch layers to the elevation of the adjacent ground surface and each layer compacted to a density at least equal to that of the adjoining undisturbed material.

3.3 STRIPPING

The entire area within the limits of existing ground to receive embankment and structures, together with strips 5 feet wide, beyond and contiguous thereto, existing levees to be degraded, ponding areas, and ditches shown on the drawing shall be stripped to remove crops, weeds, grass, and other vegetative materials to the ground surface and topsoil to a depth of 8 inches.

3.4 DISPOSITION OF CLEARED, GRUBBED, AND STRIPPED MATERIAL

Except as otherwise specified or indicated on the drawings, all materials resulting from clearing and grubbing operations shall, at the Contractor's option, be disposed of either by windrowing or stockpiling within construction limits, burying within construction limits, burning, chipping, removal from the site, or a combination thereof. In no case shall any material resulting form clearing and grubbing operations be buried or permanently placed within the levee foundation or any structural foundation. The Contractor shall make a reasonable effort to channel merchantable material into the commercial market and to make beneficial use of the materials resulting from clearing and grubbing. The topsoil material resulting from the stripping operations shall be temporarily stockpiled within the rights-of-way.

3.4.1 Windrows

Cleared, grubbed and stripped material shall be placed in a neat windrow or in piles with tree limbs trimmed sufficiently to make the windrow as small as practicable. No cleared, grubbed or stripped material shall extend beyond the construction limits.

3.4.2 Burning

Subject to applicable Federal, State and local burning restrictions, the Contractor may burn material within the contract rights-of-way. Burning operations shall be conducted so as to prevent damage to adjacent man-made facilities and natural features. The Contractor shall be responsible for any damage to life and property resulting from fires that are started by the Contractor's employees or as a result of the Contractor's operations. The Contractor shall furnish, at the site of burning operations, adequate fire fighting equipment to properly equip personnel for fighting fires. Fires shall be guarded at all times and shall be under constant surveillance until they have been extinguished. All unburned material (material not reduced to ash) shall be removed from the site or disposed of in accordance with all applicable federal, state or local regulations.

3.4.3 Burying

Subject to applicable Federal, State and local burying restrictions, the Contractor may bury the cleared and grubbed material in the area(s) as shown on the drawings or as specified by the Contracting Officer. No material shall be buried within 100 feet of any standing timber. All material disposed of by burying shall be covered with a minimum of 12 inches of earth.

3.4.4 Chipping

All cut timber, down timber, dead timber, branches, and brush may be chipped. The chips shall be hauled either to stockpiles indicated on the drawings or to other locations approved by the Contracting Officer or removed from site of work. The chips shall be deposited in these areas in either piles or windrows.

3.4.5 Removal from Site of Work

The Contractor may elect to remove all or part of the cleared and grubbed materials from the site of the work in accordance with Section 01354 ENVIRONMENTAL PROTECTION FOR CIVIL WORKS. The Contractor shall, at his option, either retain any such materials of value for his own use or dispose of them by sale or otherwise. The Government is not responsible for the protection and safekeeping of any materials retained by the Contractor. Such materials shall be removed from the site of the work before the date of completion of the work.

3.5 REMOVAL OR PLUGGING OF ABANDONED PIPE AND CONDUITS

Abandoned pipes and conduits shall be removed to the limits shown on the drawings or plugged with concrete. Prior to plugging, the Contractor shall clean the interior of the pipe to be plugged and place the concrete in such a manner as to insure a dense, well bonded plug.

3.6 SHORING, SHEETING, AND BRACING

Shoring, sheeting, and bracing shall be installed where required for the protection of existing natural features and man-made facilities, for the safety of workers and the public, in compliance with EM 385-1-1, and to insure the integrity of the embankment. Shoring, sheeting and bracing shall not be used in lieu of the required excavation slopes. Shoring, sheeting, and bracing shall be adequately designed and properly installed to withstand anticipated loads. Shoring, sheeting and bracing shall be planned and designed by a registered professional engineer. The Contractor shall submit a plan for shoring, sheeting, and bracing in accordance with paragraph SUBMITTALS. All shoring, sheeting and bracing shall be removed as embankment and backfill operations progress.

3.7 DEWATERING AND DIVERSION

Surface and groundwater control shall be accomplished in coordination with the required excavation and embankment construction. Surface and/or groundwater control may necessitate the use of temporary diversion ditches, cofferdams and/or dewatering by the use of pumping. Methods for care of surface water and for controlling the surface and groundwater levels shall be subject to approval of the Contracting Officer.

3.8 EXCAVATION

Excavation shall consist of removal of material in preparing the foundations to the lines and grades shown on the drawings, removal of material from ditches and channels to the lines and grades shown on the drawings, removal of objectionable materials and obtaining required fill materials from the borrow areas. Blasting will not be permitted. Over excavation shall be backfilled to grade with similar over excavated material or satisfactory material and compacted to a density of at least that of the surrounding material.

3.8.1 Over Excavation

3.8.1.1 Outside Limits of Levee Foundations or Structures

Over excavation outside the limits of the foundations of levees or structures shall be backfilled to grade with similar over excavated material or satisfactory material and compacted to a density of at least that of the surrounding material.

3.8.1.2 Within Limits of Levee Foundations or Structures

Over excavation within the limits of the foundations of levees or structures shall be backfilled to grade in accordance with paragraph PREPARATION OF FOUNDATION, PARTIAL FILL SURFACES AND ABUTMENTS.

3.8.2 Structures

Excavations for structures shall conform to the dimensions and elevations indicated for each structure and footing, except as specified hereinafter, and shall include trenching for utility and foundation drainage systems to a point 10 feet beyond each structure and all work incidental thereto. Excavation shall extend a sufficient distance from walls and footings to allow for placing and removal of forms. Satisfactory material removed below the depths indicated without specific direction of the Contracting Officer shall be replaced at no additional cost to the Government and filled in accordance with paragraph OVER EXCAVATION above. Over excavation below required invert elevations or bottoms of footings shall be backfilled with lean concrete at no additional cost to the Government. No footings shall be constructed on unsatisfactory material as determined by the Contracting Officer.

3.8.3 Channels

Channels shall be excavated at the locations and to the lines and grades shown on the drawings and in accordance with paragraph TOLERANCES.

3.8.4 Ditches

Drainage ditches shall be excavated at the locations and to the lines and grades shown on the drawings and in accordance with paragraph TOLERANCES.

3.8.5 Slopes and Surcharges

Temporary excavation slopes for any channel, structure excavation, or other required excavation shall not be steeper than the specified finished slope or the specified construction slope, as applicable, and subject to the approval of the Contracting Officer. This may be accomplished by benching the temporary slope so that the average slope is not steeper than the specified slope. In addition, no temporary, permanent, or construction slope shall be surcharged with excavated or stockpiled material or with heavy construction equipment which would have the same effect as the surcharge material. The toe of stockpiled material shall be maintained a minimum distance back from the top of the finished excavation equal to the depth of the excavation. The maximum height of such stockpile without causing instability of the excavation slope shall be determined by the Contractor. Any slide or other adverse conditions caused by failure of the Contractor to maintain these conditions shall be considered the responsibility of the Contractor and remedial measures shall be at the Contractor's expense.

3.8.6 Borrow Areas

3.8.6.1 Government-Furnished

Borrow areas shall be excavated to the extent necessary to obtain satisfactory material within the lines and grades as shown on the drawings. When the material necessary for the construction of the embankment and berms cannot be obtained from adjacent borrow areas, it shall be obtained from other Government-furnished borrow areas. The limits of the borrow excavation shall be as directed by the Contracting Officer. Borrow areas shall be drained and kept dry during excavation. Where possible, unsatisfactory materials in borrow areas shall not be removed.

3.8.6.2 Contractor-Furnished

Borrow areas proposed by the Contractor shall be subject to approval by the Contracting Officer. Any borrow sources proposed, accepted and approved by the Contracting Officer shall meet all applicable Federal, State and local requirements. No payment will be made for Contractor-furnished borrow areas.

3.8.7 Keyway Trenches

A cutoff trench shall be excavated and maintained free of standing water to the dimensions and locations shown on the drawings. The trench shall be excavated at least 100 feet in advance of but not more than 500 feet in advance of construction.

3.8.8 Toe Drains

Toe drains shall be excavated to the dimensions and the locations indicated on the drawings.

3.8.9 Utilities

Excavations for pipe beds shall be shaped to fit the contour of the pipe over a width of not less than 0.6 of the pipe diameter, or as shown on the drawings.

3.8.10 Rock

Rock and other hard foundation materials shall be cleaned of loose debris and cut to a firm surface, either level, stepped, or serrated, as shown on the drawings. Loose disintegrated rock and thin strata shall be removed. Rock excavation will not be measured for payment. Rock excavation will not be paid for as a separate bid item.

3.8.11 Riprap and Bedding

Excavations for riprap and bedding shall be performed at the locations and to the lines and grades shown.

3.9 TOLERANCES

A tolerance of 6 inches above or below the prescribed grade will be allowed in the excavation for channels, ditches, inspection trenches, cutoff trenches, excavations for riprap and bedding, and mandatory borrow areas. A tolerance of 6 inches below the prescribed grade will be allowed in the excavation for all other borrow areas. Tolerances in excess of 6 inches may be allowed within the borrow areas upon approval by the Contracting Officer.

All embankments and backfills shall be constructed to the grades, lines, and cross-sections shown on the drawings. At all points a tolerance of 4 inches above or below the prescribed grade will be permitted in the final dressing, provided that any excess material is so distributed that the crown of the levee drains and that there are no abrupt humps or depressions in any surfaces. For topsoil, a tolerance of 4 inches above the thickness as shown on the drawings will be permitted.

3.10 SLIDES

In case sliding occurs in any part of the excavations prescribed in this section after they have been excavated, but prior to final acceptance of all work under the contract, the Contractor shall repair the slide as directed by the Contracting Officer. In case the slide is caused through the fault of the Contractor, it shall be repaired at no cost to the Government. In case the slide is due to no fault of the Contractor, an equitable adjustment in the contract price will be made for the repairs in accordance with the Contract Clause CHANGES.

3.11 TRAVERSES

Traverses shall be left unexcavated between borrow areas at the locations shown on the drawings.

3.12 STOCKPILES

Provisions of paragraph SLOPES AND SURCHARGES are applicable to all stockpiled materials. Upon completion of construction operations, all remaining stockpiled material shall be removed and disposed of by the disposal methods specified in paragraph DISPOSITION OF EXCAVATED MATERIALS.

3.13 SURFACE DRAINAGE OF COMPLETED AREAS

The areas shown on the drawings designated as "GRADE FOR SURFACE DRAINAGE", the borrow areas, and the finished embankment areas shall be graded to the lines and grades shown on the drawings. The surface shall be free from sharp ridges, gullies, potholes, sinkholes, and any other surface irregularities. A tolerance of 6 inches above or below the prescribed grade will be allowed provided that the surface drains in the direction as indicated on the drawings.

3.14 MAINTENANCE OF WORK

3.14.1 Debris Removal

The Contractor shall maintain all ditch and channel excavations free from leaves, brush, sticks, trash, and other debris until final acceptance of all work under the contract at no additional cost to the Government.

3.14.2 Sediment Removal

Prior to final acceptance of all work under this contract, the removal of sediments from ditch or channel excavations shall be required to restore design grade and section at no additional cost to the Government.

3.15 DISPOSITION OF EXCAVATED MATERIALS

3.15.1 Satisfactory Materials

Satisfactory excavated material shall be incorporated in the appropriate zones of the embankment. Satisfactory material shall consist of material as defined in paragraph DEFINITIONS, subparagraph SATISFACTORY MATERIALS. When direct placement is not practicable, satisfactory material from the excavation shall be stockpiled for subsequent use in parts of the work for which it is specified herein and/or as indicated on the drawings. Satisfactory materials in excess of the quantity necessary to construct backfills and embankments shall be disposed of as specified for unsatisfactory materials.

3.15.2 Unsatisfactory Materials

Unsatisfactory materials shall be as defined in paragraph DEFINITIONS, subparagraph UNSATISFACTORY MATERIALS. Unsatisfactory materials from the excavations prescribed in this section shall be permanently disposed of by placing in the disposal area shown on the drawings. The material shall be shaped so that its surface is free from abrupt changes in grade and shall be sloped to drain. No additional payment will be made for Contractor-furnished disposal areas.

3.16 PREPARATION OF FOUNDATION, PARTIAL FILL SURFACES AND ABUTMENTS

3.16.1 Earth

After excavation (as described in paragraph EXCAVATION) or stripping (as described in paragraph CLEARING, GRUBBING AND STRIPPING) of the embankment foundation and excavation of the cut-off trench to the extent indicated or otherwise required, the sides of stump holes, test pits, and other similar cavities or depressions shall be broken down so as to flatten out the slopes, and the sides of the cut or hole shall be scarified to provide bond between the foundation material and the fill. The slopes and bottom of the cut-off trench shall be scarified, as directed. Unless otherwise directed, each depression shall be filled with the same material type that is to be placed immediately above the foundation. The fill shall be placed in layers, moistened, and compacted in accordance with the applicable provisions of paragraphs PLACEMENT, MOISTURE CONTROL, and COMPACTION for the specific material type. Materials which cannot be compacted by roller equipment because of inadequate clearances shall be compacted with power tampers in accordance with the paragraph COMPACTION for the specific material type. After filling of depressions and cut-off trench and immediately prior to placement of compacted fill in any section of the embankment, the foundation of such section shall be loosened thoroughly by scarifying, plowing, discing or harrowing to a minimum depth of 12 inches, and the moisture content shall be adjusted to the amount specified in paragraph MOISTURE CONTROL for the appropriate type of material. Immediately prior to placement of compacted fill on or against the surfaces of any partial fill section, all soft or loose material, all material containing cracks or gullies, and all material that does not conform with the specified zoning of the embankment shall be removed. The remaining surface of the partial fill shall be loosened by scarifying, plowing, discing or harrowing to a minimum depth of 6 inches, and the moisture content shall be adjusted as specified in paragraph MOISTURE CONTROL for the appropriate type of material. The surface of the partial fill section upon which fill is to be placed shall then be compacted as hereinafter specified for the appropriate type of fill. No separate payment will be made for loosening and rolling the foundation area, the abutment area, or the surfaces of partial fill sections, but the entire cost thereof shall be included in the applicable contract price for fill.

3.16.2 Rock Foundation

All rock surfaces upon which or against which embankment materials are to be placed shall be excavated (as described in paragraph EXCAVATION) or stripped (as described in paragraph CLEARING, GRUBBING AND STRIPPING). Prior to the placement of embankment material upon or against a rock surface, all open joints and cracks in that surface shall be filled with mortar to the depths cleaned. Those portions of such rock surfaces where, in the opinion of the Contracting Officer, the compaction of the embankment materials cannot be accomplished satisfactorily with power tampers or other specified compaction equipment, shall be filled with mortar or concrete as directed to the extent necessary to permit satisfactory use of the compaction equipment. In no case shall a thin coat of mortar be left on smooth, intact rock surfaces. Large rock overhangs and protrusions shall be removed and rock surfaces shall be laid back to a slope no steeper than 4V on 1H by the use of pre-splitting or line drilling techniques in such a manner as to minimize damage to the underlying rock, or the spaces beneath overhangs and around protrusions shall be filled with tamped concrete so that satisfactory compaction of embankment materials can be accomplished. Rock surfaces shall not be more than 2 feet in height, and benches of sufficient width shall be provided as necessary so that the average slope of any rock face is not steeper than 1V on 2H.

3.16.3 Settlement of Foundation

The Contractor shall furnish and install settlement monuments, at the locations shown on the plans, for determination of settlement of the levee following construction within the settlement measurement ranges shown on the drawings. Each monument location shall be located on the prepared levee surface at a point directly on the centerline of the constructed levee surface. The type and arrangement of the monuments shall be as shown on the drawings. The Contractor shall make such measurements and determine such elevations on the monuments following placement of fill material and again within 30 days after final completion of the levee embankment. Settlement measurements will be verified by the Contracting Officer.

3.17 PLACEMENT AND SPREADING

3.17.1 General

No fill shall be placed on any part of the embankment foundation until such areas have been inspected and given final approval by the Contracting Officer.

3.17.1.1 Gradation and Distribution

The gradation and distribution of materials throughout each zone of the levee shall be such that the embankment will be free from lenses, pockets, streaks, and layers of material differing substantially in texture or gradation from surrounding material of the same class. If lenses, pockets, or layers of materials differing substantially in texture or gradation from surrounding material occur in the spread material, the layer shall be mixed by harrowing or any other approved method to blend the materials. During the placing and spreading process, the Contractor shall maintain at all times a force of workers adequate to remove all roots, debris, and oversize stone from all embankment materials. All stones and rock fragments larger than 2/3 of the placement lift thickness measured by the greatest dimension shall be removed at the source prior to hauling to the fill. No fill shall be placed upon a frozen surface, nor shall snow, ice, or frozen earth be incorporated in the embankment.

3.17.1.2 Foundations and Partial Embankment Fills

The foundations and all partial embankment receiving fills shall be kept thoroughly drained. Placing operations will be such as to avoid mixing of materials from adjacent sections as much as practicable.

3.17.1.3 Equipment Traffic

Equipment traffic on any embankment zone shall be routed to distribute the compactive effort as much as practicable. Ruts formed in the surface of any layer of spread material will be filled before that material is compacted. If, in the opinion of the Contracting officer, the compacted surface of any layer of material is too smooth to bond properly with the succeeding layer, the surface shall be loosened by scarifying or other approved methods before material from the succeeding layer is placed.

3.17.2 Placement on Surfaces Containing Frozen Materials

Embankment shall not be placed on a foundation which contains frozen material, or which has been subjected to freeze-thaw action. This prohibition encompasses all foundation types, including the natural ground, all prepared subgrades (whether in an excavation or on an embankment, and all layers of previously placed and compacted earth fill which become the foundations for successive layers of earth fill. All material that freezes or has been subjected to freeze-thaw action during the construction work, or during periods of temporary shutdowns, such as, but not limited to nights, holidays, weekends, or winter shutdowns of earthwork operations, shall be removed to a depth that is acceptable to the Contracting Officer and replaced with new material. Alternatively, the material shall be thawed, dried, reworked and recompacted to the specified criteria before additional material is placed. The Contracting Officer will determine when placement of fill shall cease due to cold weather. The Contracting Officer may elect to use average daily air temperatures, and/or physical observation of the soils for the determination. Levee embankment material shall not contain frozen clumps of soil, snow or ice.

3.17.3 Placement of Embankment and Backfill Against Rock

All rock surfaces upon which or against embankment materials may be placed shall be cleaned in a reasonable manner and freed from organic materials or debris as deemed adequate by the Contracting Officer. In restricted areas where material can not be placed in large lifts with normal spreading and compaction equipment material shall be spread in lifts not exceeding 6 inches and compacted with mechanical hand tampers, vibrating plates, or other approved methods and equipment.

3.17.4 Placement of Embankment and Backfill Against Structures

No embankment or backfill shall be placed on or against concrete less than 7 days after placement or 70 percent of the design strength, without prior approval of the Contracting Officer. Crawler-type tractors, vibratory equipment and other similar compaction equipment shall not be used within 4 feet of any completed or partially completed structure. Compaction within 4 feet of completed or partially completed structures shall be accomplished by the use of mechanical hand tampers, vibrating plates, or other approved methods and equipment. The Contractor shall ensure that compaction operations do not damage any existing utilities. Any damage caused by the Contractor's operation shall be repaired at the Contractor's expense.

3.17.5 Compacted Clay Fill

The compacted clay fill material shall be placed and spread in layers not more than 12 inches in uncompacted thickness, except that within 4 feet of structures, the uncompacted layer thickness shall be reduced to 6 inches. Layers should be started full out to the slope stakes and shall be carried substantially horizontal and parallel to the levee centerline with sufficient crown or slope to provide satisfactory drainage during construction. The materials for compacted fill shall be placed or spread in layers, the first layer not more than 18 inches in thickness and the succeeding layers not more than 12 inches in thickness prior to compaction.

3.17.6 Gravel Drain Rock

The Gravel Drain Rock shall be placed and spread in layers not more than 12 inches in uncompacted thickness, except that within 4 feet of structures, the uncompacted layer thickness shall be reduced to 6 inches. Layers should be started full out to the slope stakes and shall be carried substantially horizontal and parallel to the levee centerline with sufficient crown or slope to provide satisfactory drainage during construction.The materials for Gravel Drain Rock shall be placed or spread in layers, the first layer not more than 12 inches in thickness and the succeeding layers not more than 12 inches in thickness prior to compaction.

3.17.7 Uncompacted Fill

Uncompacted fill shall be placed in approximately horizontal layers not exceeding 12 inches in thickness. The layers shall be uniformly spread, distributed, and otherwise manipulated during placement to such an extent that individual loads of material deposited on the fill will not remain intact, and large, open voids in the fill will be eliminated. Lifts shall not be placed in a manner which causes shrinkage cracks and open voids from developing in previously placed lifts.

3.17.8 Hydraulic Fill

3.17.8.1 Discharge Pipe Outlets

During placement operations of the fill, free outlets to conduct discharge water away from the embankment shall be provided at intervals of not more than 2,000 feet. No obstruction to free flow will be permitted in these outlets or at any point in the fill area, between the end of the discharge pipe and the outlet.

3.17.8.2 Control of Materials in Hydraulic Construction

In general, the materials in the fill shall be distributed in such a way as to produce a section of relatively uniform permeability. In order to maintain uniform permeability of the fill, the Contractor shall not place strata and large pockets of gravel, not containing sufficient fines. Whenever they occur they shall be promptly blended with finer materials. The Contractor shall take necessary precautions to prevent damage from discharge water or other causes.

3.17.8.3 Rehandling Hydraulic Material

Rehandling of hydraulic material to bring the fill area to required grade and cross section shall be performed in accordance with the same requirements set forth in paragraph Select Fill. If, in the opinion of the Contracting Officer, the rehandled material is too dry to permit its placement by compacted fill method, then the soil placement shall conform to paragraph MOISTURE CONTROL.

3.18 MOISTURE CONTROL

3.18.1 General

The materials in each layer of the fill shall contain the amount of moisture, within the limits specified below or as directed by the Contracting Officer, necessary to obtain the required compaction. Material that is not within the specified moisture content limits after compaction shall be reworked to obtain the specified moisture content, regardless of density.

3.18.1.1 Insufficient Moisture for Suitable Bond

If the top or contact surfaces of a partial fill section become too dry to permit suitable bond between these surfaces and the additional fill to be placed thereon, the Contractor shall loosen the dried materials by scarifying or discing to such depths as may be directed by the Contracting Officer, shall dampen the loosened material to an acceptable moisture content, and shall compact this layer in accordance with the applicable requirements of paragraph COMPACTION.

3.18.1.2 Excessive Moisture for Suitable Bond

If the top or contact surfaces of a partial fill section become too wet to permit suitable bond between these surfaces and the additional fill to be placed thereon, the wet material shall be scarified and permitted to dry, assisted by discing or harrowing, if necessary, to such depths as may be directed by the contracting officer. The material shall be dried to an acceptable moisture content, and shall be compacted in accordance with the applicable requirements of paragraph COMPACTION.

3.18.1.3 Drying Wet Material

Material that is too wet shall be dried in the borrow area prior to bringing to the levee embankment be assisted by discing or harrowing, if necessary, until the moisture content is reduced to an amount within the specified limits.

3.18.1.4 Increasing Moisture in Dry Material

The moisture content of material that is too dry, will be adjusted on the levee embankment. The Contractor will add water to the fill material and by harrowing, or other approved methods, work the moisture into the material until a uniform distribution of moisture within the specified limits is obtained. Water applied on a layer of fill on the levee embankment shall be accurately controlled in amount so that free water will not appear on the surface during or subsequent to rolling. Should too much water be added to any part of the embankment, the rolling on that section of the embankment shall be delayed until the moisture content of the materials is reduced to an amount within the specified limits. If it is impracticable to obtain the specified moisture content by wetting or drying the material on the fill, the Contractor may be required to pre-wet or dry back the material at the source of excavation or in the borrow area.

3.18.2 Compacted Clay Fill

The moisture content after compaction shall be within the limits of 2 percentage points above optimum to 4 percentage point below optimum moisture content as determined by ASTM D 698.

3.18.3 Gravel Drain Rock

Each layer of material shall be placed, worked, and compacted in a saturated condition.

3.18.4 Uncompacted Fill

Uncompacted fill will be placed at their in situ water content.

3.18.5 Hydraulic Fill

No moisture control is required for Hydraulic Fill.

3.19 COMPACTION

3.19.1 Compaction of Embankment Fill

After a layer of material has been dumped and spread, it shall be harrowed to break up and blend the fill materials and to obtain uniform moisture distribution. Harrowing shall be performed with a heavy disk plow, or other approved harrow, to the full depth of the layer. If one pass of the harrow does not accomplish the breaking up and blending of the materials, additional passes of the harrow shall be required, but in no case will more than three passes of the harrow on any one layer be required for this purpose. When the moisture content and the condition of the layer are satisfactory, the lift shall be compacted with not less than three complete coverages of an approved tamping roller traversing in a direction parallel to the axis of the levee. If the desired compaction to a minimum of 95 percent of the maximum dry density as determined by the Contractor in accordance with ASTM D 698 is not achieved, additional rolling will be required. In areas which are not accessible by roller, the fill shall be placed in layers not more than 12 inches in uncompacted depth and compacted with an approved hand operated compactor to a density equal to that obtained in other areas which are accessible to rollers. Dumping, spreading, sprinkling, and compacting may be performed at the same time at different points along a section when there is sufficient area to permit these operations to proceed simultaneously. Compaction equipment shall be operated such that the strip being traversed by the roller shall overlap the rolled adjacent strip by not less than 3 feet.

3.19.2 Compaction of Uncompacted Fill

No compaction other than that obtained by the controlled movement of the hauling equipment over the area of the fill is required. Equipment shall be routed so as to prevent excessive rutting of the fill surface.

3.19.3 Compaction of Gravel Drain Rock

Gravel Drain Rock placed in the drains shall be placed in maximum 12 inch loose lifts and compacted by not less than four (4) complete coverages with a static roller. Each lift of gravel within confined spaces which is not accessible to rollers shall be compacted by at least 3 complete coverages with a

vibratory plate compactor and as many additional coverages as necessary to achieve the same density obtained with full-size compaction equipment.

3.19.4 Compaction Adjacent to Structures and Utilities

Heavy equipment for spreading and compacting fill shall not be operated within 4 feet of structures or utilities, except as otherwise specified herein. Material within 4 feet shall be compacted using appropriate hand operated compactors specified herein.

3.19.5 Topsoil

Topsoil shall be placed on the embankment surfaces as shown on the contract drawings and as specified in paragraph PREPARATION OF FOUNDATION, PARTIAL FILL SURFACES AND ABUTMENTS.

3.20 FIELD QUALITY CONTROL

3.20.1 Clearing, Grubbing, and Stripping

The Contractor shall establish and maintain quality control for clearing, grubbing, and stripping operations to assure compliance with contract requirements, and maintain records of the quality control for all construction operations including but not limited to the items indicated below. These records, as well as the records of corrective actions taken, shall be furnished to the Government in accordance with Section 01451 CONTRACTOR QUALITY CONTROL.

3.20.1.1 Clearing

Station to station limits, transverse clearing limits from applicable centerline; percentage of area complete; types of materials cleared.

3.20.1.2 Grubbing

Station to station limits, transverse grubbing limits from applicable centerline; percentage of area complete; type of material; filling of grubbed holes.

3.20.1.3 Stripping

Station to station limits, transverse stripping limits from applicable centerline; percentage of area complete; type of material; depth of stripping.

3.20.2 Excavation

The Contractor shall establish and maintain quality control for excavation operations to assure compliance with contract requirements, and maintain records of the Contractor's quality control for all construction operations including but not limited to the following:

a. Lines, grades and tolerances,

b. Segregation of materials,

c. Disposal and/or stockpiling of materials,

d. Unsatisfactory materials,

e. Conditions that may induce seepage or weaken the foundation or embankment,

f. Stability of excavations.

Records of inspections and tests, as well as the records of corrective actions taken, shall be furnished to the Government in accordance with Section 01451 CONTRACTOR QUALITY CONTROL.

3.20.3 Embankment

3.20.3.1 General

The Contractor shall establish and maintain field quality control for foundation preparation, embankment and backfill operations to assure compliance with contract requirements and maintain detailed records of field quality control for all operations including but not limited to the following:

a. Earthwork Equipment

Type, size, number of units and suitability for construction of the prescribed work.

b. Foundation Preparation

Methods of preparing the foundations in advance of embankment and backfill construction and methods for providing drainage of the foundation and partially completed fills.

3.20.3.2 Materials Testing

The contractor shall perform sufficient testing to insure that the fill is being constructed as specified. The testing program specified below shall be considered the minimum acceptable frequency of testing. This does not relieve the Contractor from the responsibility of performing additional testing, if required to ensure compliance with these specifications.

a. Soil Classification Tests

Soil classification tests shall be performed in accordance with ASTM D 2487. One initial classification test shall be required for each different classification of material to be utilized as embankment fill or backfill. As prescribed in ASTM D 2487, grain size analyses in accordance with ASTM D 422 and Atterberg limits in accordance with ASTM D 4318 shall be

performed on each different classification. The Contractor shall submit additional tests for every 20,000 cubic yards of embankment or backfill material. Soil classification tests shall be performed on foundation material as required to determine the acceptability of the in-situ soils. Additional tests will be required if noticeable changes in the material occur.

b. Cohesive Material Testing

(1) Moisture Density Relationships. The moisture-density relations for each different classification of cohesive material utilized shall be determined in accordance with ASTM D 698, Method B. During fill placement a minimum of one additional moisture-density test shall be performed for every 20,000 cubic yard placed. Additional tests will be required each time a new material is encountered. The moisture-density curves will be compiled to form a family of curves which will be utilized to estimate optimum properties (maximum dry density and optimum moisture content) to be used with field density test.

(2) Water (Moisture) Content Tests. Determination of water content shall be performed in accordance with ASTM D 2216. ASTM D 4643 may be used when rapid moisture content results are needed. All rapid results obtained by ASTM D 4643 shall be confirmed by a test on a duplicate sample performed in accordance with ASTM D 2216. In the event of disagreement between the results, ASTM D 2216 shall govern. One water content test will be performed for each 10,000 cubic yards of material placed or each lift of material whichever is less. These test will be in addition to the water content tests performed in conjunction with in-place density tests. Backfill and fills not meeting the required specifications for water content shall be retested after corrective measures have been applied.

(3) In-place Density Testing for Cohesive Materials. The in-place density of the cohesive materials shall be determined in accordance with ASTM D 1556, ASTM D 2167, ASTM D 2922, ASTM D 2937, or ASTM D 5195. At least one (1) in-place density test shall be performed for every 10,000 cubic yards of completed fill with the horizontal locations randomly staggered in the fill. In lieu of more frequent testing, the contractor shall perform a compaction test strip in the presence of the Contracting Officer. No more than 5,000 cubic yards of fill material may be placed prior to the test strip. The compaction test strip shall be tested after each pass of compaction equipment to determine the optimum number of passes for teh compaction equipment to provide maximum compaction. The number of passes that results in the maximum in-place density prior to breaking the material down will be established as the standard for compactive effort. The contractor shall utilize this compactive effor with diligence. Equipment is subject to successful demonstration and approval. Any change in compaction equipment shall be subject to a performance rating by means of placement of a compaction test strip in the presence of the Contracting Officer. The size, method of placement, and thickness of the compaction test strip(s) and the subsequent judgement of performance of the compaction equipment will be determined by the Contracting Officer. Fill not meeting the required specifications for in-place density shall be retested after additional compaction has been completed. When nuclear method is used for in-place density testing according to ASTM D 2922 and ASTM D 3017, the first test and every tenth test thereafter for each material type shall include a sand cone correlation test in accordance with ASTM D 1556. The sand cone test shall be performed adjacent to the location of the nuclear test, shall include a nominal 6 inch diameter sand cone, and shall include a minimum wet soil weight of 6 pounds extracted from the hole. Nuclear density testing equipment shall not be used during rain. The density correlations shall be submitted with test results. Each transmittal including density test data shall include a summary of all density correlations for the job neatly prepared on a summary sheet including at a minimum:

(i) Meter serial number and operators initials.
(ii) Standard count for each test.
(iii) Material type.
(iv) Probe depth.
(v) Moisture content by each test method and the deviation.
(vi) Wet density by each test method and the deviation.

c. Cohesionless Material Testing

(1) Compaction Tests. The Contractor shall run not less than one relative density test for every 10,000 cubic yards of cohesionless fill in accordance with ASTM D 4253 and ASTM D 4254.

(2) In-Place Density Tests. The in-place density of the cohesionless materials shall be determined in accordance with ASTM D 1556, ASTM D 2167, ASTM D 2922, ASTM D 2937, or ASTM D 5195. The Contractor shall run not less than one (1) field in-place density test on each lift of material or every 10,000 cubic yards of completed embankment fill or backfill whichever is less. Horizontal locations shall be randomly staggered in the fill. When nuclear method is used for in-place density testing according to ASTM D 2922 and ASTM D 3017, the first test and every tenth test thereafter for each material type shall include a sand cone correlation test in accordance with ASTM D 1556. The sand cone test shall be performed adjacent to the location of the nuclear test, and shall include a nominal 6 inch diameter sand cone, and shall include a minimum wet soil weight of 6 pounds extracted from the hole. The density correlations shall be submitted with test results. Each transmittal including density test data shall include a summary of all density correlations for the job neatly prepared on a summary sheet including at a minimum:

(i) Meter serial number and operators initials.
(ii) Standard count for each test.
(iii) Material type.
(iv) Probe depth.
(v) Moisture content by each test method and the deviation.
(vi) Wet density by each test method and the deviation.

(3) Water (Moisture) Content Tests. Determination of water content shall be performed in accordance with ASTM D 2216. ASTM D 4643 may be used when rapid moisture content results are needed. All rapid results obtained by ASTM D 4643 shall be confirmed by a test on a duplicate sample performed in accordance with ASTM D 2216. In the event of disagreement between the results, ASTM D 2216 shall govern. One water content test will be performed for each 10,000 cubic yards of material placed or each lift of material whichever is less. These test will be

in addition to the water content tests performed in conjunction with in-place density tests. Backfill and fills not meeting the required specifications for water content shall be retested after corrective measures have been applied.

d. Additional Testing

The Contracting Officer may request additional tests if there is reason to doubt the adequacy of the compaction, or special compaction procedures are being used, or materials change or if the Contracting Officer determines that the Contractor's testing is inadequate or the Contractor is concentrating backfill and fill operations in a relatively small area.

3.20.3.3 Materials

Suitability of materials for use in embankment and backfill.

3.20.3.4 Fill Placement

Layout, maintaining existing drainage, moisture control, thickness of layers, removal of oversized material, spreading and compaction for embankment and backfill.

3.20.3.5 Grade and Cross Section

Surveys to verify that the dimensions, slopes, lines and grades conform to those shown on the drawings. Surveys to monitor settlement gages to measure foundation settlement.

3.20.3.6 Reporting

On a daily basis, the Contractor shall furnish the inspection records and all material testing results, the quantity of fill placed, as well as the records of corrective action taken, in accordance with Section 01451 CONTRACTOR QUALITY CONTROL.

-- End of Section --

SECTION 02373

SEPARATION/FILTRATION GEOTEXTILE
02/98

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of the specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 3786	(1987) Hydraulic Bursting Strength of Knitted Goods and Nonwoven Fabrics: Diaphragm Bursting Strength Tester Method
ASTM D 4354	(1996) Sampling of Geosynthetics for Testing
ASTM D 4355	(1992) Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus)
ASTM D 4491	(1995) Water Permeability of Geotextiles by Permittivity
ASTM D 4533	(1991) Trapezoid Tearing Strength of Geotextiles
ASTM D 4632	(1991) Grab Breaking Load and Elongation of Geotextiles
ASTM D 4751	(1995) Determining Apparent Opening Size of a Geotextile
ASTM D 4759	(1988; R 1996) Determining the Specification Conformance of Geosynthetics
ASTM D 4833	(1988; R 1996) Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
ASTM D 4873	(1995) Identification, Storage, and Handling of Geosynthetic Rolls

1.2 MEASUREMENT

Measurement shall be made of the as-built surface area in square yards covered by geotextile. Allowance will be made for geotextile in anchor and/or drainage trenches but no allowance will be made for waste, overlaps, damaged materials, repairs, or materials used for the convenience of the Contractor.

1.3 PAYMENT

Geotextile installed and accepted will be paid for at the respective contract unit price in the bidding schedule. This unit price shall include the cost of materials, equipment, installation, testing, and other costs associated with placement of the geotextile.

1.4 SUBMITTALS

Government approval is required for submittals with a "GA" designation. Submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Thread; GA.

A minimum of 14 days prior to scheduled use, proposed thread type for sewn seams along with data sheets showing the physical properties of the thread.

SD-06 Instructions

Manufacturing Quality Control Sampling and Testing; GA.

A minimum of 14 days prior to scheduled use, manufacturer's quality control manual including instructions for geotextile storage, handling, installation, seaming, and repair.

SD-09 Reports

Seams; GA.

Seam strength test results.

SD-13 Certificates

Geotextile; GA.

A minimum of 14 days prior to scheduled use, manufacturer's certificate of compliance stating that the geotextile meets the requirements of this section. This submittal shall include copies of manufacturer's quality control test results. For needle punched geotextiles, the manufacturer shall also certify that the geotextile has been continuously inspected using permanent on-line full-width metal detectors and does not contain any needles which could damage other geosynthetic layers. The certificate of compliance shall be attested to by a person having legal authority to bind the geotextile manufacturer.

1.5 DELIVERY, STORAGE AND HANDLING

Delivery, storage, and handling of geotextile shall be in accordance with ASTM D 4873.

1.5.1 Delivery

The Contracting Officer will be present during delivery and unloading of the geotextile. Rolls shall be packaged in an opaque, waterproof, protective plastic wrapping. The plastic wrapping shall not be removed until deployment. If quality assurance samples are collected, rolls shall be immediately rewrapped with the plastic wrapping. Geotextile or plastic wrapping damaged during storage or handling shall be repaired or replaced, as directed. Each roll shall be labeled with the manufacturer's name, geotextile type, roll number, roll dimensions (length, width, gross weight), and date manufactured.

1.5.2 Storage

Geotextile rolls shall be protected from becoming saturated. Rolls shall either be elevated off the ground or placed on a sacrificial sheet of plastic. The geotextile rolls shall also be protected from the following: construction equipment, ultraviolet radiation, chemicals, sparks and flames, temperatures in excess of 160 degrees F, and any other environmental condition that may damage the physical properties of the geotextile.

1.5.3 Handling

Geotextile rolls shall be handled and unloaded with load carrying straps, a fork lift with a stinger bar, or an axial bar assembly. Rolls shall not be dragged along the ground, lifted by one end, or dropped to the ground.

PART 2 PRODUCTS

2.1 RAW MATERIALS

2.1.1 Geotextile

Geotextile shall be a woven pervious sheet of polymeric material and shall consist of long-chain synthetic polymers composed of at least 95 percent by weight polyolefins, polyesters, or polyamides. The use of woven slit film geotextiles (i.e. geotextiles made from yarns of a flat, tape-like character) will not be allowed. Stabilizers and/or inhibitors shall be added to the base polymer, as needed, to make the filaments resistant to deterioration by ultraviolet light, oxidation, and heat exposure. Regrind material, which consists of edge trimmings and other scraps that have never reached the consumer, may be used to produce the geotextile. Post-consumer recycled material may also be used. Geotextile shall be formed into a network such that the filaments or yarns retain dimensional stability relative to each other, including the selvages. Geotextiles and factory seams shall meet the requirements specified in Table 1. Where applicable, Table 1 property values represent minimum average roll values (MARV) in the weakest principal direction. Values for AOS represent maximum average roll values.

TABLE 1. GEOTEXTILE PHYSICAL PROPERTIES

PROPERTY	TEST METHOD		TEST VALUE
Elongation at Break, percent	Less Than 50	Greater Than 50	ASTM D 4632
Apparent Opening Size (U.S. Sieve)	40	80	ASTM D 4751
Permittivity, sec-1	2.0	1.5	ASTM D 4491
Puncture, lbs.	90	55	ASTM D 4833
Grab Tensile, lbs.	250	160	ASTM D 4632
Trapezoidal Tear, lbs.	90	55	ASTM D 4533
Burst Strength, psi	400	190	ASTM D 3786
Ultraviolet Stability (percent strength retained at 500 hours)	100	60	ASTM D 4355

2.1.2 Thread

Sewn seams shall be constructed with high-strength polyester, nylon, or other approved thread type. Thread shall have ultraviolet light stability equivalent to the geotextile and the color shall contrast with the geotextile.

2.2 MANUFACTURING QUALITY CONTROL SAMPLING AND TESTING

Manufacturing quality control sampling and testing shall be performed in accordance with the manufacturer's approved quality control manual. As a minimum, geotextiles shall be randomly sampled for testing in accordance with ASTM D 4354, Procedure A. Acceptance of geotextile shall be in accordance with ASTM D 4759. Tests not meeting the specified requirements shall result in the rejection of applicable rolls.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Subgrade Preparation

The surface underlying the geotextile shall be smooth and free of ruts or protrusions which could damage the geotextile. Subgrade materials and compaction requirements shall be in accordance with Section 02331, Paragraph PREPARTION OF FOUNDATION, PARTIAL FILL SURFACES AND ABUTMENTS.

3.1.2 Placement

The Contractor shall request the presence of the Contracting Officer during handling and installation. Geotextile rolls which are damaged or contain imperfections shall be repaired or replaced as directed. The geotextile shall be laid flat and smooth so that it is in direct contact with the subgrade. The geotextile shall also be free of tensile stresses, folds, and wrinkles. On slopes greater than 5 horizontal on 1 vertical, the geotextile shall be laid with the machine direction of the fabric parallel to the slope direction.

3.2 SEAMS

3.2.1 Overlap Seams

Geotextile panels shall be continuously overlapped a minimum of 12 inches. Where it is required that seams be oriented across the slope, the upper panel shall be lapped over the lower panel. The Contractor has the option of field sewing instead of overlapping.

3.2.2 Sewn Seams

Seams shall be continuously sewn at the locations shown on the drawings. The thread at the end of each seam run shall be tied off to prevent unraveling. Seams shall be on the top side of the geotextile to allow inspection. Skipped stitches or discontinuities shall be sewn with an extra line of stitching with a minimum of 18 inches of overlap.

3.3 PROTECTION

The geotextile shall be protected during installation from clogging, tears, and other damage. Damaged geotextile shall be repaired or replaced as directed. Adequate ballast (e.g. sand bags) shall be used to prevent uplift by wind. The geotextile shall not be left uncovered for more than 14 days during installation.

3.4 REPAIRS

Geotextile damaged during installation shall be repaired by placing a patch of the same type of geotextile which extends a minimum of 12 inches beyond the edge of the damage or defect. Patches shall be continuously fastened using a sewn seam or other approved method. The machine direction of the patch shall be aligned with the machine direction of the geotextile being repaired. Geotextile which cannot be repaired shall be replaced.

3.5 PENETRATIONS

Engineered penetrations of the geotextile shall be constructed by methods recommended by the geotextile manufacturer.

3.6 COVERING

Geotextile shall not be covered prior to approval by the Contracting Officer. The Contractor shall request the presence of the Contracting Officer during covering of the geotextile. The cover soil shall have a maximum particle size of 1 inch and shall be free of sticks, roots and other objects which could damage the geotextile. The direction of backfilling shall proceed in the direction of down gradient shingling of geotextile overlaps. However, on side slopes, soil backfill shall be placed from the bottom of the slope upward. Cover soil shall be placed in a manner that prevents soil from entering the geotextile overlap zone, prevents tensile stress from being mobilized in the geotextile, and prevents wrinkles from folding over onto themselves. No equipment shall be operated directly on top of the geotextile. A minimum of 12 inches of soil shall be maintained between full-scale construction equipment tires/tracks and the geotextile during the covering process. Compaction and testing requirements for cover soil are described in Section 02331, Paragraph PLACEMENT AND SPREADING.

-- End of Section --

SECTION 02380

STONE, CHANNEL, SHORELINE/COASTAL PROTECTION FOR STRUCTURES
08/99

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 33	(1999) Concrete Aggregates
ASTM C 127	(1988; R 1993) Specific Gravity and Absorption of Coarse Aggregate
ASTM C 136	(1996a) Sieve Analysis of Fine and Coarse Aggregates
ASTM C 295	(1998) Petrographic Examination of Aggregates for Concrete
ASTM D 75	(1997) Sampling Aggregates
ASTM D 3740	(1996) Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
ASTM D 4791	(1995) Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM D 4992	(1994) Evaluation of Rock to be Used for Erosion Control
ASTM D 5312	(1992) Evaluation of Durability of Rock for Erosion Control Under Freezing and Thawing Conditions
ASTM D 5313	(1992; R 1997) Evaluation of Durability of Rock for Erosion Control Under Wetting and Drying Conditions
ASTM E 548	(1994) General Criteria Used for Evaluating Laboratory Competence

CORPS OF ENGINEERS (COE)

COE CRD-C 148	(1969) Testing Stone for Expansive Breakdown on Soaking in Ethylene Glycol

ENGINEERING MANUALS (EM)

EM 1110-2-1601	(1994) Hydraulic Design of Flood Control Channels

1.2 UNIT PRICES

1.2.1 Gravel Drain Rock

1.2.1.1 Payment

Payment for gravel, crushed stone, and sand placed for bedding and/or filter material will be made at the applicable contract unit prices for Gravel "Drain Rock". Price(s) and payment(s) shall include all costs of furnishing, hauling, placing and maintaining the bedding and/or filter material until placement of the riprap cover is completed and accepted. Geotextiles used as filters will be paid for in accordance with provisions of Section 01270 MEASUREMENT AND PAYMENT. Preparation of the base will not be paid for separately and all costs incidental thereto shall be included in contract prices for other items for which payment will be made. No payment will be made for excess thickness of bedding and/or filter material, nor for material required to replace subgrade material lost by rainwash, wind erosion, overexcavation or otherwise.

1.2.1.2 Measurement

Gravel, placed for bedding and/or filter layers will be measured for payment by the cubic yard. Quantities will be computed to the nearest whole cubic yard. Gravel, crushed stone, and sand will be measured for payment, in the presence of the Contracting Officer, by weighing on approved, accurately calibrated scales furnished by and at the expense of the Contractor. Weight certificates furnished by a public weighmaster will be acceptable.

1.2.1.3 Unit of Measure

Unit of measure: cubic yard.

1.2.2 Riprap

1.2.2.1 Payment

Payment for riprap satisfactorily placed will be made at the applicable contract unit price for Riprap. Price(s) and payment(s) shall constitute full compensation for furnishing, hauling, handling, placing, and maintaining the riprap until final acceptance by the Government. No separate payment will be made for the stockpiling of riprap, and all cost in connection with stockpiling shall be included in the contract unit price for riprap.]

1.2.2.2 Measurement

Riprap will be measured for payment as the weight, as determined from weight certificates, of the material placed.

1.2.2.2.# Determination of Excess Stone

All stone outside the limits and tolerances of the cross sections of the structure, except variations so minor as not to be measurable, will be deducted from the quantity of new stone for which payment is to be made. Weight of excess stone will be determined from the cross sections obtained by the method provided for in paragraph FINAL SURVEYS, on the basis that the cubic feet of volume (including voids) for each type of stone, as listed in the Table in paragraph FACTORS USED FOR CONVERTING IN PLACE VOLUME TO WEIGHT, is equal to one ton or 2,000 pounds for the bulk specific gravity and percentage of voids shown. If the bulk specific gravity of the stone furnished or the percentage of voids is other than as listed below, the cubic feet of volume equaling 2,000 pounds shall be recomputed as described in paragraph REVISIONS OF BIDDING SCHEDULE QUANTITIES. Should any excess stone be disclosed above the tolerance line as defined in paragraph TOLERANCES, its volume will be computed by the average end area method, based upon the cross section in the following manner. The average end area of excess stone above the tolerance line for two (2) successive cross sections, multiplied by the distance between the cross sections will be accepted as the volume. The Contractor will not be required to remove such excess stone and deductions for the weights thereof will be made from contract payments for new stone. In addition to the above, stone, which has been delivered to the site and has been lost or wasted or otherwise not properly incorporated into the final required work, shall be deducted from the quantity for which payment is to be made.

1.2.2.2.# Final Surveys

Survey work and measurements required for determination of excess volume computations for stone materials shall be performed by the Contractor in the presence of the Contracting Officer. The Contractor shall notify the Contracting Officer not less than 3 days in advance of each survey. In the event of unavailability of the Contracting Officer, the Contractor shall perform the survey and certify to the Contracting Officer that it complies with the specifications. Cross section surveys shall be taken perpendicular to the axis of the structures. Elevations and soundings shall be taken on lines 50 feet apart measuring along the structure reference line, with the readings at 5-foot intervals and at breaks in the grade along the line. Other survey intervals and readings may be used if deemed appropriate or advisable by the Government's on-site representative. Additional cross sections, elevations, and soundings may be taken if determined necessary by the Government's on-site representative. Determination of quantities will be made by the Government's on-site representative and having once been made, will not reopen, except on evidence of collusion, fraud or obvious error. Prior to performing any work under this Section, the Contractor shall coordinate all operations with the Government's on-site representative so that excess volume surveys will be made at the appropriate time. The surveys made under paragraph CHECK SURVEYS may be used when deemed appropriate by the Government's on-site representative, as part of the surveys required herein. Stone quantity computations shall be based entirely upon weights of new stone as determined from carrier displacement or certified scale weight tickets.

1.2.2.3 Unit of Measure

Unit of measure: ton.

1.2.3 Reworking and Utilizing Existing Stone Materials

1.2.3.1 Payment

Payment for reworking existing stone materials and utilizing existing stone in lieu of required materials from off-site sources will not be paid for separately from construction utilizing materials obtained from off-site sources. Specifications pertaining to construction with existing on-site materials are included in Section 02331 SITE PREPARATION.

1.2.3.2 Measurement

Reworking and Utilizing Existing Stone Materials will be measured for payment as Riprap based upon cubic yards of surface area of existing protection.

1.2.3.3 Unit of Measure

Unit of measure: cubic yard.

1.3 DESIGN REQUIREMENTS

1.3.1 Bulk Specific Gravity of Stone and Redesign

1.3.1.1 Modification of Specified Design Range of Bulk Specific Gravity

If the Contractor, after award of the Contract, requests approval of stone from a source(s) which has a range of bulk specific gravity (SSD), whose limits are lower or higher than the specified design range of 2.5 to 2.9 as specified in paragraph MATERIAL QUALITY, consideration will be given to revising the project design through modification of the design range under the following conditions:

a. The modification of the specified design range will result in a savings to the Government. Such savings shall not be subject to Contract Clause VALUE ENGINEERING-CONSTRUCTION of Section 00700 CONTRACT CLAUSES.

b. Only one (1) such proposal for modification will be allowed. In addition, the required completion time shall not be extended more than thirty (30) calendar days as a result of redesign for any reason, including acts of the Government.

c. The modified design range of bulk specific gravity (SSD) to be used shall not have a lower limit of less than 2.30 nor higher than 3.50.

d. The stone sections of the required structure are to be redesigned by the Government. Such redesign will be based upon the Contractor's proposed modifications to the specified design range of

bulk specific gravity (SSD) and will include any required revisions to allowable tolerances. Only one such redesign will be made.

(1) The above redesign will be made upon written request from the Contractor. The request shall state the proposed modified design range of bulk specific gravity (SSD). With the request, the Contractor shall submit records of laboratory tests performed on the proposed stone source(s) indicating the range of bulk specific gravity (SSD) of the stone source(s). The laboratory tests shall have been performed by a Government validated commercial laboratory.

(2) The Government shall be allowed a period of twenty-one (21) calendar days after receipt of the request to make the redesign. The redesign will be made based upon the lower limit of the proposed modified design range of bulk specific gravity (SSD) furnished.

(3) Upon completion of the redesign it will be furnished to the Contractor, including revised estimated quantities for the BIDDING SCHEDULE, based upon the average bulk specific gravity (SSD) of the proposed modified design.

(4) Upon receipt of the redesign, the Contractor shall make a proposal to modify the allowable range.

e. Any proposal to modify the specified design range shall be submitted within fifteen (15) calendar days after receipt of the Government's redesign and shall include a statement as to the savings which will result from the modification. If a formal proposal is not submitted within the time limit, the work shall be performed in accordance with the specified design, in which case the Contractor shall not be allowed to use stone having a bulk specific gravity (SSD) less than the specified design range.

f. The statement of savings shall be in the form of a proposed revised BIDDING SCHEDULE showing unchanged unit prices for the revised quantities.

g. If the Contractor elects to perform the work in accordance with the redesign, the estimated quantities to be shown in the BIDDING SCHEDULE will be the quantities derived from the Government's redesign. See the above paragraph REVISION OF BIDDING SCHEDULE QUANTITIES.

1.4 GOVERNMENT TESTING AND STUDIES

1.4.1 Stone

1.4.1.1 General

All stone shall be durable material as approved by the Contracting Officer. Selected stone from the required excavation may be used if it satisfies all requirements as to quality and dimensions. In case an unlisted source is to be used, the Contractor shall show that an adequate quantity of material is available and provide quality test data. Stone shall be of a suitable quality to ensure permanence in the structure and in the climate in which it is to be used. It shall be free from cracks, blast fractures, bedding, seams and other defects that would tend to increase its deterioration from natural causes. Inspections for cracks, fractures, seams and defects shall be made by visual examination. If, by visual examination, it is determined that 20 percent or more of the stone produced contains hairline cracks, then all stone produced by the means and measures which caused the fractures shall be rejected. A hairline crack that is defined as being detrimental shall have a minimum width of 4 mil and shall be continuous for one-third the dimension of at least two sides of the stone. The stone shall be clean and reasonably free from soil, quarry fines, and shall contain no refuse.

1.4.1.2 Sources

Stone shall be furnished from any of the sources listed at the end of this section, or at the option of the Contractor may be furnished from any other source designated by the Contractor and accepted by the Contracting Officer, subject to the conditions herein stated. If the Contractor proposes to furnish stone from a source not currently listed at the end of this section, the Government will conduct a quarry investigation and evaluate the quality test data provided by the contractor to determine whether acceptable stone can be produced from the proposed source. Satisfactory service records on other work may be acceptable. In order for stone to be acceptable on the basis of service records, stone of a similar size must have been placed in a similar thickness and exposed to weathering under similar conditions as are anticipated for this contract, and must have satisfactorily withstood such weathering for a minimum of 5 years. If no such records are available, the Government will conduct tests to assure the acceptability of the stone. In addition to an acceptable 5 year service record, the Contracting Officer has the option to elect to have representative samples taken and tested.

a. Selection of Source. The Contractor shall designate in writing only one source or one combination of sources from which he proposes to furnish stone. It is the Contractor's responsibility to determine that the stone source or combination of sources selected is capable of providing the quality, quantities and gradation needed and at the rate needed to maintain the scheduled progress of the work. Samples for acceptance testing shall be provided in accordance with paragraph EVALUATION TESTING below. If a source for stone so designated by the Contractor is not accepted for use by the Contracting Officer, the Contractor may not propose other sources but shall furnish the stone from a source listed at the end of this section at no additional cost to the Government.

b. Acceptance of Materials. Acceptance of a source of stone is not to be construed as acceptance of all material from that source. The right is reserved to reject materials from certain localized areas, zones, strata, or channels, when such materials are unsuitable for stone as determined by the Contracting Officer. The Contracting Officer also reserves the right to reject individual units of produced specified materials in stockpiles at the quarry, all transfer points, and at the project construction site when such materials are determined to be unsuitable. During the course of the work, the stone may be tested by the Government, if the Contracting Officer determines that testing is necessary. If such tests are determined necessary, the testing will be done in the Government's testing laboratory or commercial laboratory selected by the Government. Materials produced from a listed or unlisted source shall meet all the requirements herein. The cost of testing will be at the Government's expense. During the contract period, both prior to and after materials are delivered to the job site, visual inspections and measurements of the stone materials may be performed by the Contracting Officer. If the Contracting Officer, during the inspections, finds that the stone

quality, gradation or weights of stone being furnished are not as specified or are questionable, re-sampling and re-testing by the Contractor shall be required. Sampling of the delivered stone for testing and the manner in which the testing is to be performed shall be as directed by the Contracting Officer. This additional sampling and testing shall be performed at the Contractor's expense when test results indicate that the materials do not meet specified requirements. When test results indicate that materials meet specified requirements, an equitable adjustment in the contract price will be made for the sampling and testing. Any material rejected shall be removed or disposed of as specified and at the Contractor's expense.

1.4.1.3 Evaluation Testing of Stone

The tests to which the stone may be subjected will include petrographic analysis, specific gravity, unit weight, absorption, wetting and drying, freezing and thawing and such other tests as may be considered necessary to demonstrate that the stone is of a satisfactory quality which is at least equivalent to stone from the sources listed at the end of this section.

a. Bulk Specific Gravity, saturated surface dry (SSD) and Absorption. Stone shall have a bulk specific gravity, saturated surface dry, (SSD), greater than 2.48. The stone shall have an absorption less than 2 percent unless other tests and service records show that the stone is satisfactory. The method of test for bulk specific gravity (SSD) and absorption will be ASTM C 127.

b. Samples. Samples of stone from a source not listed at the end of this section shall be taken by a representative of the quarry under the supervision of the Contracting Officer for testing and acceptance prior to delivery of any stone from this source to the site of the work. Samples shall consist of at least three pieces of stone, roughly cubical in shape and weighing not less than 150 pounds each from each unit that will be used in the production of the required stone. If the source is an undeveloped quarry, or if the operation has been dormant for more than one year such that fresh samples are not available, the Contractor shall expose fresh rock for 20 feet horizontally and for the full height of the face proposed for production, prior to the field evaluation. The Contracting Officer may also require documentation of subsurface exploration of an undeveloped quarry in order to determine whether or not sufficient reserves are available.

c. Tests. The tests will be conducted in accordance with applicable Corps of Engineers methods of tests given in the Handbook for Concrete and Cement or ASTM methods of tests. The cost of testing one new source will be borne by the Government.

1.4.1.4 Drop Test

A drop test provides an immediate evaluation of the durability of very large stone during handling of the stone including placement into a structure. For comparability, the test stone(s) shall be dropped from a bucket or by other means from a height of not less than half the average diameter of the stone onto a rigid surface or second stone of comparable size. Dumping from a truck is not acceptable. The stone shall be examined carefully before as well as after the completion of the test. Failure criteria is the development of new cracks, opening of old cracks, and the loss of piece from the surface of the stone. Each stone shall be dropped a total of five times for evaluation purposes with examination after each drop. The Contractor shall provide all necessary equipment and operating personnel to help perform the testing.

1.5 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Redesign Data; GA.

If the Contractor proposes to utilize stone having a specific gravity outside of the specific design range, and as a result thereof, the Government provides the Contractor with a redesign, then, within fifteen (15) calendar days after receipt of the Government's redesign, submit a formal proposal to perform the work in accordance with the redesign. The submittal shall include a statement of the direct savings to the Government and a tabulation in the form of a revised BIDDING SCHEDULE showing unchanged unit prices for the revised quantities.

Riprap; GA. Filter Material; GA. Gravel Drain Rock; GA.

Submit the source for materials used in riprap.

Ready-Mix Concrete Grout; FIO.

When ready-mixed grout is furnished, submit a delivery ticket for each batch delivered to the jobsite. The ticket shall show the total weight inpounds of cement, water, and fine and coarse aggregate, amount(s) of admixture(s), time of loading, and the revolution counter reading at the time of batching.

Conveying and Placing; FIO.

Submit the methods and equipment for transporting, handling, depositing, and consolidating the grout prior to first grout placement.

Admixtures; FIO. Curing Materials; FIO.

Submit manufacturers' literature for the concrete admixtures and curing materials.

Batching and Mixing Equipment; FIO.

Submit manufacturers' data on the concrete grout batching and mixing equipment.

Gaging Table Data; FIO.

Submit stone hauling vessel gaging tables and a copy of the data and calculations used for the preparation of the tables.

SD-09 Reports

Gradation Test; GA.

Submit the gradation tests using the GRADATION TEST DATA SHEET enclosed at end of this section for riprap or stone.

SD-13 Certificates

Stone; FIO.

Submit certificates of compliance attesting that the materials meet specification requirements.

Laboratory; GA.

Submit a copy of the documents, provided by the Materials Testing Center (MTC) at CEWES or other governmental agency, that validates that the laboratory can perform the required tests. The individual tests shall be listed for which the validation covers along with the date of the inspection.

Weigh Scale Certification; FIO.

Submit a copy of the certification from the regulation agency attesting to the scale's accuracy.

Certified Weight Scale Tickets; FIO.

Submit a copy of each certified weight scale ticket 5 working day(s) after weighing.

SD-14 Samples

Stone; GA.

Submit suitable stone samples prior to delivery of any such material to the worksite if stone is not from one of the stone sources listed at the end of this section.

SD-18 Records

Bulk Specific Gravity; FIO.

At least 30 calendar days in advance of shipment of stone to the work site, submit a copy of bulk specific gravity test results for each gradation range of stone proposed to be furnished. The information shall be furnished prior to preparation of pre-production demonstration stockpiles.

1.6 REGULATORY REQUIREMENTS

The regulatory requirements listed below form a part of this specification to the extent referenced. The regulatory requirements are referred to in the text by basic designation only.

KANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

Standard Specifications for Highway Construction

1.7 CONSTRUCTION TOLERANCES

The finished surface and stone layer thickness shall not deviate from the lines and grades shown by more than the tolerances listed below. Tolerances are measured perpendicular to the indicated neatlines. Extreme limits of the tolerances given shall not be continuous in any direction for more than five (5) times the nominal stone dimension nor for an area greater than 200 square feet of the structure surface.

NEATLINE TOLERANCES

MATERIAL	ABOVE NEATLINE inches	BELOW NEATLINE inches
Riprap	12	4

The intention is that the work shall be built generally to the required elevations, slope and grade and that the outer surfaces shall be even and present a neat appearance. Placed material not meeting these limits shall be removed or reworked as directed by the Contracting Officer. Payment will not be made for excess material which the Contracting Officer permits to remain in place.

1.8 TERMINOLOGY

1.8.1 Standard Drawings

Details of various types of structures in general use are shown on standard drawings forming a part of these specifications.

1.8.2 Stone Protection

Stone Protection is defined as a system which includes a layer or layers of filter material beneath a layer or layers of riprap. Stone protection is placed around structures in slack water or within a dewatered site. Stone protection may also be used to protect channel banks when it is placed in the dry or in slack water.

1.8.3 Riprap

Riprap is defined as a material having a gradation band similar to those specified in EM 1110-2-1601, Chapter 3, uniform graded material. Riprap is normally produced by mechanical methods, with a jaw crusher and grizzly after the stone has been mined by blasting in a quarry. Riprap gradations have a maximum top size of 3.5 tons.

1.8.4 Channel Protection

Channel protection is stone placed in a current as revetment, dikes, or slope paving without the use of a separate layer of bedding or filter material. In this type of environment, bedding sand or geotextiles and materials with gradation bands with a top size of 150 mm (6 inches) will not stay where placed.

PART 2 PRODUCTS

2.1 GRAVEL DRAIN ROCK

2.1.1 General

Gravel Drain Rock shall consist of gravel or crushed stone.

2.1.2 Material

Gravel Drain Rock shall be composed of tough, durable particles, adequately free from thin, flat and elongated pieces, and shall contain no organic matter nor soft, friable particles in quantities considered objectionable by the Contracting Officer. The aggregates shall meet the quality requirements of ASTM C 33. Gradation shall conform to the following requirements:

U.S. STANDARD SIEVE	PERMISSIBLE LIMITS PERCENT BY WEIGHT, PASSING
(1-1/2 inches)	(100)
(1 - inch)	(95-100)
(1/2 - inch)	(25-60)
(No. 4)	(0-10)
(No. 8)	(0-5)

The Gravel Drain Rock shall be well-graded between the limits shown. At least one test shall be performed on each 1000 cubic yards placed for each specified gradation in accordance with ASTM C 136. A representative sample weighing not less than 100 pounds shall be removed from the bedding layer placed at locations directed by the Contracting Officer. All points on individual grading curves obtained from representative samples of gravel drain rock shall lie between the boundary limits as defined by smooth curves drawn through the tabulated gradation limits plotted on ENG FORM 2087 or similar form. The individual gradation curves within these limits shall not exhibit abrupt changes in slope denoting either gap grading or scalping of certain sizes or other irregularities which would be detrimental to the proper functioning of the bedding layers.

2.2 FILTER MATERIAL

Filter material shall consist of Geotextile as specified in Section 02373, SEPARATION/FILTRATION GEOTEXTILE.

2.3 STONE

2.3.1 General

2.3.1.1 Evaluation Testing of Stone

If the Contractor proposes to furnish stone from an unlisted source, the Contractor shall have evaluation tests performed on stone samples collected from the proposed source. The quarry investigation shall be performed by a registered geologist or registered engineer. The tests to which the stone shall be subjected include petrographic examination (ASTM C 295), bulk specific gravity (SSD), absorption (ASTM C 127), resistance of stone to freezing and thawing (ASTM D 5312), and if argillaceous limestone and sandstone are used, resistance to wetting and drying (ASTM D 5313).

The laboratory to perform the required testing shall be validated based on compliance with ASTM E 548 and relevant paragraphs of ASTM D 3740, and no work requiring testing shall be permitted until the laboratory has been inspected and validated. The first inspection of the facilities shall be at the expense of the Government and any subsequent inspections required because of failure of the first inspection shall be at the expense of the Contractor.

a. Bulk Specific Gravity Range. All stone shall have a minimum bulk specific gravity, saturated surface dry (SSD), of 2.50 based upon water having a unit weight of 62.4 pounds per cubic foot. The method of test for bulk specific gravity (SSD) shall be ASTM C 127.

b. Unit Weight and Absorption. Stone shall have a bulk specific gravity, saturated surface dry, greater than 2.50. The stone shall have an absorption less than 2 percent unless other tests and service records show that the stone is satisfactory. The method of test for unit weight and absorption shall be ASTM C 127, except the unit weight shall be calculated in accordance with Note No. 5 using bulk specific gravity, saturated surface dry.

c. Petrographic Examination. Stone shall be evaluated in accordance with ASTM C 295 which shall include information required by ASTM D 4992, paragraph 10. COE CRD-C 148 shall be used to perform Ethylene glycol tests required on rocks containing smectite as specified in ASTM D 4992 and on samples identified to contain swelling clays.

d. Resistance to Freezing and Thawing. Stone shall have a maximum loss of 10 percent after the number of cycles specified in ASTM D 5312, Figure 1, when determining the durability of stone when subjected to freezing and thawing in accordance with ASTM D 5312, except the surface area of one side of the sample shall be between 144 square inches and 2304 square inches.

e. Resistance of Rock to Wetting and Drying. Stone shall have a maximum loss of 2 percent when determining the durability of stone when subject to wetting and drying in accordance with ASTM D 5313, except the surface area of one side of the sample shall be between 144 square inches and 2304 square inches.

f. Samples. Samples of stone from a source not listed at the end of this section shall be taken by a representative of the Quarry under the supervision of the Contracting Officer for testing and acceptance prior to delivery of any stone from this source to the site of the work. Information provided with the samples shall include the location within the quarry from which the sample was taken along with a field examination of the quarry. The field examination shall include the information outline in ASTM D 4992, paragraph 7. Samples shall consist of at least three pieces of stone, roughly cubical in shape and weighing not less than 150 pounds each from each unit that shall be used in the production of the required stone. If the source is an undeveloped quarry, or if the operation has been dormant for more than one year such that fresh samples are not available, the Contractor shall expose fresh rock for 20 feet horizontally and for the full height of the face proposed for production, prior to the field evaluation. The Contracting Officer may also require documentation of subsurface exploration of an undeveloped quarry in order to determine whether or not sufficient reserves are available. The samples shall be shipped at the Contractor's expense to a laboratory validated by the government to perform the required tests.

g. Tests. The tests shall be conducted by the Contractor in accordance with applicable ASTM and Corps of Engineers methods of tests given in the Handbook for Concrete and Cement, and shall be performed at a laboratory validated by the government. The cost of testing shall be borne by the Contractor.

2.3.1.2 Proportional Dimension Limitations

The maximum aspect ratio (greatest dimension:least dimension) of any piece of stone for size ranges shall be not greater than 3:1 when measured across mutually perpendicular axis. Not more than 25 percent (25%) of the stones within a gradation range shall have an aspect ratio greater than 2.5:1. A maximum of 15 percent flat and elongated pieces by weight will be acceptable. A flat and elongated piece of riprap is defined as having a ratio of width to thickness or length to width greater than 3:1. ASTM D 4791 shall be used as a guide to perform the test.

2.3.1.3 Riprap Stockpile

Storage of riprap at the worksite is not to be confused with off-site stockpiling of riprap. If the Contractor elects to provide off-site stockpiling areas, the Contracting Officer shall be notified by the Contractor of all such areas. The first layer shall be a maximum of 6 feet high. After being stockpiled, any riprap which has become contaminated with soil or refuse shall not be put into the work unless the contaminating material has been removed from the riprap prior to placement.

2.3.1.3.# Worksite Stockpile

Riprap delivered to the work sites, which requires temporary storage shall be placed in a container suitable for storing the riprap without waste, or a sand-clay-gravel or crushed stone pad may be constructed for the storage area and removed upon completion of the work. If the sand-clay-gravel or crushed stone pad method is used, the pad shall have a minimum thickness of at least 6 inches. The container or sand-clay-gravel or crushed stone pad method shall be subject to approval prior to delivery of the riprap. Upon completion of the work, the storage areas shall be cleaned of all storage residues and returned to their natural condition.]Temporary storage of riprap at the worksite will be allowed, provided the stockpile toe of the riprap be no closer than 60 linear feet from the closest edge of the excavation's top slope, and the amount shall not exceed 200 T unless otherwise approved.

2.3.1.3.# Off-site Stockpile

In areas where riprap is stockpiled for placement, the area shall have excess rock removed prior to completion of work. All rock and spalls greater than 3 inches in diameter shall be removed. Where rocks may have become buried due to soft ground or operation of the equipment, the rock shall be disposed of as directed. After the rock has been removed, the storage area shall be graded, dressed, and filled to return the ground surface as near as practical to the condition that existed prior to construction.

2.3.2 Riprap

Only quarried stone shall be used. Riprap quality shall be as specified in paragraph GOVERNMENT TESTING AND STUDIES, subparagraph STONE. Stone shall be well graded and shall conform to the table below:

PERCENT LIGHTER BY WEIGHT (SSD)	LIMITS OF STONE WEIGHT, LB.
80 - 100	350
40 - 60	150
10 - 30	60

PART 3 EXECUTION

3.1 DEMONSTRATION SECTION

Prior to placement of stone, the Contractor shall construct a section of stone protection consisting of riprap to demonstrate his proposed operations for production placement. The section shall demonstrate procedures and capability of grading, placing stone and bank protection within the tolerances specified. The demonstration section shall be 100 feet in length and shall conform to all applicable specifications.

3.1.1 Methods and Equipment

Methods and equipment employed for placement shall demonstrate the adequacy for use in placement of riprap and shall conform with the requirements specified. The quantities of all materials placed within the section shall be accurately tabulated and provided immediately to the Contracting Officer for comparison with computed quantities.

3.1.2 Demonstration Section Evaluation

The Contractor shall not proceed with placing stone protection prior to the approval of the demonstration section. Within a period of 7 days after completion of the section, the Contracting Officer shall determine the adequacy of the section to function as part of the permanent construction. The Contractor shall be notified as to the acceptability of the section and may be directed to modify methods of construction and remove the section if necessary.

3.1.3 Removal of Demonstration Section

If removal of the demonstration section is required, it shall be conducted in such a manner as to maintain the integrity of the underlying subgrade. The Contractor shall make his own arrangements for disposal in areas not located on the site.

3.2 BASE PREPARATION

Areas on which geotextile and riprap are to be placed shall be graded and/or dressed to conform to cross sections shown on the contract drawings within an allowable tolerance of plus 2 inches and minus 4 inches from the theoretical slope lines and grades. The prepared base shall be approved by the Contracting Officer. Where such areas are below the allowable minus tolerance limit they shall be brought to grade by fill with earth similar to the adjacent material and then compacted to a density equal to the adjacent in place material. Immediately prior to placing the geotextile, the prepared base will be inspected by the Contracting Officer and no material shall be placed thereon until that area has been approved.

3.3 PLACEMENT OF RIPRAP

3.3.1 General

Riprap shall be placed on the filter layers specified in paragraph(s) FILTER MATERIAL within the limits shown on the contract drawings.

3.3.2 Placement

Under water placement rates shall be used when the top of the layer to be placed is covered by more than 3 feet of water.

3.3.2.1 Above Water

Riprap shall be placed in a manner which will produce a well-graded mass of rock with the minimum practicable percentage of voids, and shall be constructed, within the specified tolerances, to the lines and grades shown on the contract drawings or staked in the field. A tolerance of plus 6 inchand minus 6 inch from the slope lines and grades shown on the contract drawings will be allowed in the finished surface of the riprap, except that the extreme of this tolerance shall not be continuous over an area greater than 200 square feet. The average tolerance of the entire job shall have no more than 50 percent of the tolerances specified above. Riprap shall be placed by means of truck, crane operated skip-pan (box), dragline bucket, clamshell, rock-bucket, hydraulic excavator ("Gradall"), trackhoe, or other approved equipment. Riprap shall be placed to its full course thickness in one operation and in such manner as to avoid displacing the filter material. The large stones shall be well distributed and the entire mass of stones in their final position shall be graded to conform to the gradation specified in paragraph RIPRAP, subparagraph GENERAL. Placement shall begin at the bottom of the area to be covered and continue up slope. Subsequent loads of material shall be placed against previously placed material in such a manner as to ensure a relatively homogenous mass. The finished riprap shall be free from objectionable pockets of small stones and clusters of larger stones. Placing riprap in layers will not be permitted. Placing riprap by dumping it into chutes, or by similar methods likely to cause segregation of the various sizes, shall not be permitted. Placing riprap by dumping it at the top of the slope and pushing it down the slope shall not be permitted. No equipment shall be operated directly on the completed stone protection system. The desired distribution of the various sizes of stones throughout the mass shall be obtained by selective loading of the material at the quarry or other source; by controlled dumping of successive loads during final placing; or by other methods of placement which will produce the specified results. Each truckload shall be representative of the gradation requirements. Rearranging of individual stones shall be required to the extent necessary to obtain a well-graded distribution of stone sizes as specified above. However, manipulating stone by means of dozers or other blade equipment shall not be permitted. Unless otherwise authorized by the Contracting Officer, riprap shall be placed in conjunction with the construction of the embankment and with only sufficient lag in construction of the stone protection as may be necessary to prevent mixing of embankment and stone protection materials. The Contractor shall maintain the stone protection until accepted by the Contracting Officer and any material displaced prior to acceptance and due to the Contractor's negligence shall be replaced at his expense and to the lines and grades shown on the contract drawings.

3.3.2.2 Under Water

When riprap is placed under water onto geotextile it may be dropped from the water surface if the water depth over the geotextile is greater than 5 feet. Prior to starting work, the Contractor shall submit his proposed method of placing riprap under water. Riprap to be placed in the wet shall be done during periods of low water levels during the months of June through November.

3.4 PLACEMENT OF HAND-PLACED RIPRAP

3.4.1 General

Hand-placed riprap shall be placed on the filter material specified in paragraph(s) FILTER MATERIAL within the limits shown. Stone shall conform to the requirements of paragraph RIPRAP. Except for spalls for wedging, stone shall be roughly rectangular in shape of which the least dimension shall be not less than one-third the length.

3.4.2 Placement

The riprap shall be carefully placed by hand in such a manner that adjacent stones are in close contact and, in general, have their greatest dimensions across the slope. "Through stones" shall be well-distributed throughout the mass and the sum of their cross sections, parallel to the slope being protected, shall be not less than two-thirds of such area. As used in this specification a "through stone" is defined as a stone whose dimension normal to the surface being riprapped is not less than the full depth of the riprap. Placement shall begin at the bottom of the area to be covered and continue up slope. Subsequent loads of material shall be placed against previously placed material in such a manner as to ensure a relatively homogenous mass. Placement shall begin at the bottom of the area to be covered and continue up slope. Subsequent loads of material placed on the slope shall be immediately adjacent to previously placed material in such a manner to ensure a relatively homogenous mass. The riprap along the lower edge of an area shall consist of the largest stones set in a trench so as to form a band. Except for spalls used to fill voids between larger stone, no stone shall be used in the exposed face of the riprap which will extend less than one-half the thickness of the riprap. Spaces between the larger stones shall be filled with spalls and smaller stones of the largest feasible size to form a compact mass. Spalls and small stone shall not be place in nests in lieu of larger size stone. A tolerance of plus or minus 6 inch from the slope lines and grades shown will be allowed in the finished surface of the riprap paving, except that the extreme of this tolerance shall not be continuous over an area greater than 200 square feet.]

3.5 TESTS AND INSPECTIONS

3.5.1 Pre-Production

3.5.1.1 Bulk Specific Gravity

Quantity determinations are contingent upon the range of bulk specific gravity (saturated surface dry

(SSD) basis) of stone to be supplied. Therefore, during the process of selecting a source or sources of stone for the project, the Contractor shall make an investigation to determine the lowest and highest bulk specific gravity (SSD) of stone available at the source or sources he proposes to utilize for each gradation range of stone. Tests shall be performed at a Government approved testing laboratory in accordance with ASTM C127. The testing results shall be submitted in accordance with paragraph SUBMITTALS. Test results which display an extraordinarily wide range of values may necessitate additional testing to determine whether the source contains stratas with stones of an acceptable range of bulk specific gravity. For Category I sources which have been acceptably tested not more than two years earlier, and the material is of an acceptable quality and bulk specific gravity, the Contracting Officer may waive the requirement for bulk specific gravity testing.

3.5.1.2 Material Quality

Before selecting a source for preparation of a demonstration stockpile, the Contractor shall be reasonably certain that the source is capable of meeting the quality and source requirements specified in paragraphs SOURCES and EVALUATION TESTING OF STONE, including their respective subparagraphs.

3.5.1.3 Borderline Material Quality

If the COR's evaluation of a demonstration stockpile results in not being able to determine by visual examination whether the material is acceptable or unacceptable, the COR will select at least one but not more than three representative stones from the demonstration stockpile to be prepared for shipment to the Government's laboratory for testing in accordance with paragraph EVALUATION TESTING OF STONE. Where specified sizes are in excess of 2,000 pounds, the Contractor shall cut or break a representative piece, weighing approximately 2,000 pounds each, off of the selected stones. For specified stone sizes of less than 2,000 pounds but more than 500 pounds, individual samples shall be the size of the largest stone specified for the size range. Samples of stone groupings with a maximum size less than 500 pounds shall contain at least two (2) stones representative of the higher limit of the stone weights specified. In addition, the sample shall be representative of the gradation specified and the minimum weight of the total sample shall be not less than 500 pounds. The sampling and testing procedures shall be repeated for each strata being quarried. The Contractor shall ship the samples to the laboratory as specified in paragraph EVALUATION TESTING OF STONE. If the laboratory testing reveals the materials are unacceptable, the Contractor shall submit a replacement source for approval and proceed with the demonstration stockpile procedures anew.

3.5.1.4 Demonstration Stockpile at Source

Following submittal of the Contractor's Quality Control (CQC) Plan and the Contractor's selection of a source, but prior to the Government's approval of a source and the CQC Plan, the Contractor shall make arrangements to provide a pre-production demonstration stockpile for each of the stone size ranges for the project. The stockpiles shall be located at the source of the stone and be shaped in windrow fashion. The stones with a size range greater than 3 tons shall be placed in a single layer with 1 foot of clear space around each stone. Stones under 3 tons in weight shall not be stacked higher than 4 feet. The stones placed in the demonstration stockpiles shall be representative of the overall quality of materials in the source and shall not consist of the best specimens unless it is reasonable to determine that the source will provide the required amount of stone of the applicable size range with a degree of quality no less than that existent in the demonstration stockpile. The quantity of stone in each demonstration stockpile shall be dependent upon the gradation size range to be produced for the project.

3.5.2 Gravel Drain Rock, Filter Layers

3.5.2.1 General

The Contractor shall perform gradation tests to assure compliance with contract requirements and shall maintain detailed records. The gravel drain rock and filter materials shall be sampled in accordance with ASTM D 75 and tested in accordance with ASTM C 136.

3.5.2.2 Reporting

Reporting shall be in accordance with paragraph GRADATION TEST.

-- End of Section --

SECTION 02630

STORM-DRAINAGE SYSTEM
09/98

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO HB-16	(1996) Standard Specifications for Highway Bridges
AASHTO M 243	(1994) Field Applied Coating of Corrugated Metal Structural Plate for Pipe, Pipe-Arches, and Arches
AASHTO M 294	(1994) Corrugated Polyethylene Pipe, 305- to 915- mm (12-to 36 in.) Diameter
AASHTO MP6	(1995) Corrugated Polyethylene Pipe 1050 and 1200 mm Diameter

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 123/A 123M	(1997a) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 742/A 742M	(1995) Steel Sheet, Metallic Coated and Polymer Precoated for Corrugated Steel Pipe
ASTM A 760/A 760M	(1997) Corrugated Steel Pipe, Metallic-Coated for Sewers and Drains
ASTM A 798/A 798M	(1997) Installing Factory-Made Corrugated Steel Pipe for Sewers and Other Applications
ASTM A 807	(1996) Installing Corrugated Steel Structural Plate Pipe for Sewers and Other Applications
ASTM C 231	(1997) Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM D 1056	(1991) Flexible Cellular Materials - Sponge or Expanded Rubber
ASTM D 1171	(1994) Rubber Deterioration - Surface Ozone Cracking Outdoors or Chamber (Triangular Specimens)
ASTM D 1557	(1991) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu.m.))
ASTM D 1752	(1984; R 1996) Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction
ASTM D 2167	(1994) Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D 2922	(1996) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(1988; R 1993) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
ASTM D 3350	(1996) Polyethylene Plastics Pipe and Fittings Materials
ASTM F 477	(1995) Elastomeric Seals (Gaskets) for Joining Plastic Pipe
ASTM F 714	(1994) Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter

1.2 MEASUREMENT AND PAYMENT

1.2.1 Outlet Pipe and Toe Drains

The length of outlet pipe installed will be measured along the centerline of the pipe from end to end of pipe without deduction for the diameter of the water control structure. The length of the toe drain pipe installed will be measured along the centerline of the pipe from end to end of the pipe. Pipe will be paid for at the contract unit price for the number of linear feet of outlet pipe or toe drain piping placed in the accepted work.

1.2.2 Rock Excavation

Payment will be made for the number of cubic yards of material acceptably excavated, as specified and defined as rock excavation in Section 02316 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS, measured in the original position, and computed by allowing actual width of rock excavation with the following limitations: maximum rock excavation width, 30 inches for pipe of 12 inch or less nominal diameter; maximum rock excavation width, 16 inches greater than outside diameter of pipe of more than 12 inch nominal diameter. Measurement will include authorized overdepth excavation. Payment will also include all necessary drilling and blasting, and all incidentals necessary for satisfactory excavation and disposal of authorized rock excavation. No separate payment will be made for backfill material

required to replace rock excavation; this cost shall be included in the Contractor's unit price bid per cubic yard for rock excavation. In rock excavation for manholes and other appurtenances, 1 foot will be allowed outside the wall lines of the structures.

1.2.3 Backfill Replacing Unstable Material

Payment will be made for the number of cubic yards of select granular material required to replace unstable material for foundations under pipes or drainage structures, which will constitute full compensation for this backfill material, including removal and disposal of unstable material and all excavating, hauling, placing, compacting, and all incidentals necessary to complete the construction of the foundation satisfactorily.

1.2.4 [Enter Appropriate Subpart Title Here]

1.2.9 Outlet Control Structure (Sta 70+77)

Payment will be a lump sum amount as shown on the bidding schedule for the outlet control structure (Sta 70+77) which includes the reinforced concrete pad, 54-inch diameter CSP riser with 36-inch diameter stubouts and bands, stop logs, and locking lid as shown on the contract drawings.

1.3 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-06 Instructions

Placing Pipe; GA.

Printed copies of the manufacturer's recommendations for installation procedures of the material being placed, prior to installation.

SD-13 Certificates

Resin Certification; GA. Pipeline Testing; GA. Hydrostatic Test on Watertight Joints; GA. Determination of Density; GA.

Certified copies of test reports demonstrating conformance to applicable pipe specifications, before pipe is installed. Certification on the ability of frame and cover or gratings to carry the imposed live load.

SD-14 Samples

Pipe for Culverts and Storm Drains; GA.

1.4 DELIVERY, STORAGE, AND HANDLING

1.4.1 Delivery and Storage

Materials delivered to site shall be inspected for damage, unloaded, and stored with a minimum of handling. Materials shall not be stored directly on the ground. The inside of pipes and fittings shall be kept free of dirt and debris. Before, during, and after installation, plastic pipe and fittings shall be protected from any environment that would result in damage or deterioration to the material. The Contractor shall have a copy of the manufacturer's instructions available at the construction site at all times and shall follow these instructions unless directed otherwise by the Contracting Officer. Solvents, solvent compounds, lubricants, elastomeric gaskets, and any similar materials required to install plastic pipe shall be stored in accordance with the manufacturer's recommendations and shall be discarded if the storage period exceeds the recommended shelf life. Solvents in use shall be discarded when the recommended pot life is exceeded.

1.4.2 Handling

Materials shall be handled in a manner that ensures delivery to the trench in sound, undamaged condition. Pipe shall be carried to the trench, not dragged.

PART 2 PRODUCTS

2.1 PIPE FOR CULVERTS AND STORM DRAINS

Pipe for culverts and storm drains shall be of the sizes indicated and shall conform to the requirements specified.

2.1.1 Corrugated Steel Pipe

ASTM A 760/A 760M, zinc coated pipe as follows:

Type I pipe with helical corrugations and a polymeric coating on both sides of not less than 0.010 inch thick conforming to ASTM A 742/A 742M.

2.1.2 PE Pipe

The pipe manufacturer's resin certification indicating the cell classification of PE used to manufacture the pipe shall be submitted prior to installation of the pipe. The minimum cell classification for polyethylene plastic shall apply to each of the seven primary properties of the cell classification limits in accordance with ASTM D 3350.

2.1.2.1 Smooth Wall PE Pipe

ASTM F 714, maximum DR of 21 for pipes 3 to 24 inches in diameter and maximum DR of 26 for pipes 26 to 48 inches in diameter. Pipe shall be produced from PE certified by the resin producer as meeting the requirements of ASTM D 3350, minimum cell class 335434C.

2.1.2.2 Corrugated PE Pipe

AASHTO M 294, Type S, for pipes 12 to 36 inches and AASHTO MP6, Type S or D, for pipes 42 to 48 inches produced from PE certified by the resin producer as meeting the requirements of ASTM D 3350, minimum cell class 315412C or 324420C. Pipe walls shall have the following properties:

Nominal Size (in.)	Minimum Wall Area (square in/ft)	Minimum Moment of Inertia of Wall Section (in to the 4th/in)
12	1.50	0.024
15	1.91	0.053
18	2.34	0.062
24	3.14	0.116
30	3.92	0.163
36	4.50	0.222
42	4.69	0.543
48	5.15	0.543

2.1.2.3 Profile Wall PE Pipe

ASTM F 894, RSC 160, produced from PE certified by the resin producer as meeting the requirements of ASTM D 3350, minimum cell class 334433C. Pipe walls shall have the following properties:

		Minimum Moment Of Inertia of Wall Section (in to the 4th/in)	
Nominal Size (in.)	Minimum Wall Area (square in/ft)	Cell Class 334433C	Cell Class 335434C
18	2.96	0.052	0.038
21	4.15	0.070	0.051
24	4.66	0.081	0.059
27	5.91	0.125	0.091
30	5.91	0.125	0.091
33	6.99	0.161	0.132
36	8.08	0.202	0.165
42	7.81	0.277	0.227
48	8.82	0.338	0.277

2.2 MISCELLANEOUS MATERIALS

2.2.1 Concrete

Unless otherwise specified, concrete and reinforced concrete shall conform to the requirements for 4000 psi concrete under Section 03301 CAST-IN-PLACE STRUCTURAL CONCRETE FOR CIVIL WORKS. The concrete mixture shall have air content by volume of concrete, based on measurements made immediately after discharge from the mixer, of 5 to 7 percent when maximum size of coarse aggregate exceeds 1-1/2 inches. Air content shall be determined in accordance with ASTM C 231. The concrete covering over steel reinforcing shall not be less than 1 inch thick for covers and not less than 1-1/2 inches thick for walls and flooring. Concrete covering deposited directly against the ground shall have a thickness of at least 3 inches between steel and ground. Expansion-joint filler material shall conform to ASTM D 1751, or ASTM D 1752, or shall be resin-impregnated fiberboard conforming to the physical requirements of ASTM D 1752.

2.2.2 Joints

2.2.2.1 External Sealing Bands

Requirements for external sealing bands shall conform to ASTM C 877.

2.2.2.2 Flexible Watertight, Gasketed Joints

a. Gaskets: When infiltration or exfiltration is a concern for pipe lines, the couplings may be required to have gaskets. The closed-cell expanded rubber gaskets shall be a continuous band approximately 7 inches wide and approximately 3/8 inch thick, meeting the requirements of ASTM D 1056, Type 2 A1, and shall have a quality retention rating of not less than 70 percent when tested for weather resistance by ozone chamber exposure, Method B of ASTM D 1171. Rubber O-ring gaskets shall be 13/16 inch in diameter for pipe diameters of 36 inches or smaller and 7/8 inch in diameter for larger pipe having 1/2 inch deep end corrugation. Rubber O-ring gaskets shall be 1-3/8 inches in diameter for pipe having 1 inch deep end corrugations. O-rings shall meet the requirements of AASHTO M 198 or ASTM C 443. Flexible plastic gaskets shall conform to requirements of AASHTO M 198, Type B.

b. Connecting Bands: Connecting bands shall be of the type, size and sheet thickness of band, and the size of angles, bolts, rods and lugs as indicated or where not indicated as specified in the applicable standards or specifications for the pipe. Exterior rivet heads in the longitudinal seam under the connecting band shall be countersunk or the rivets shall be omitted and the seam welded. Watertight joints shall be tested and shall meet the test requirements of paragraph HYDROSTATIC TEST ON WATERTIGHT JOINTS.

2.2.2.3 Corrugated PE Plastic Pipe

Water tight joints shall be made using a PVC or PE coupling and rubber gaskets as recommended by the pipe manufacturer. Rubber gaskets shall conform to ASTM F 477. Soil tight joints shall conform to the requirements in AASHTO HB-16, Division II, Section 26.4.2.4. (e) for soil tightness and shall be as recommended by the pipe manufacturer.

2.3 STEEL LADDER

Steel ladder shall be provided where the depth of the manhole exceeds 12 feet. These ladders shall be not less than 16 inches in width, with 3/4 inch diameter rungs spaced 12 inches apart. The two stringers shall be a minimum 3/8 inch thick and 2-1/2 inches wide. Ladders and inserts shall be galvanized after fabrication in conformance with ASTM A 123/A 123M.

2.4 HYDROSTATIC TEST ON WATERTIGHT JOINTS

2.4.1 Corrugated Steel and Aluminum Pipe

A hydrostatic test shall be made on the watertight joint system or coupling band type proposed. The moment strength required of the joint is expressed as 15 percent of the calculated moment capacity of the pipe on a transverse section remote from the joint by the AASHTO HB-16 (Division II, Section 26). The pipe shall be supported for the hydrostatic test with the joint located at the point which develops 15 percent of the moment capacity of the pipe based on the allowable span in feet for the pipe flowing full or 40,000 foot-pounds, whichever is less. Performance requirements shall be met at an internal hydrostatic pressure of 10 psi for a 10 minute period for both annular corrugated metal pipe and helical corrugated metal pipe with factory reformed ends.

PART 3 EXECUTION

3.1 EXCAVATION FOR PIPE CULVERTS, STORM DRAINS, AND DRAINAGE STRUCTURES

Excavation of trenches, and for appurtenances and backfilling for culverts and storm drains, shall be in accordance with the applicable portions of Section 02316 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS and the requirements specified below.

3.1.1 Trenching

The width of trenches at any point below the top of the pipe shall be not greater than the outside diameter of the pipe plus 12 inches to permit satisfactory jointing and thorough tamping of the bedding material under and around the pipe. Sheeting and bracing, where required, shall be placed within the trench width as specified. Contractor shall not overexcavate. Where trench widths are exceeded, redesign with a resultant increase in cost of stronger pipe or special installation procedures will be necessary. Cost of this redesign and increased cost of pipe or installation shall be borne by the Contractor without additional cost to the Government.

3.1.2 Removal of Rock

Rock in either ledge or boulder formation shall be replaced with suitable materials to provide a compacted earth cushion having a thickness between unremoved rock and the pipe of at least 8 inches or 1/2 inch for each foot of fill over the top of the pipe, whichever is greater, but not more than three-fourths the nominal diameter of the pipe. Where bell-and-spigot pipe is used, the cushion shall be maintained under the bell as well as under the straight portion of the pipe. Rock excavation shall be as specified and defined in Section 02316 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS.

3.1.3 Removal of Unstable Material

Where wet or otherwise unstable soil incapable of properly supporting the pipe, as determined by the Contracting Officer, is unexpectedly encountered in the bottom of a trench, such material shall be removed to the depth required and replaced to the proper grade with select granular material, compacted as provided in paragraph BACKFILLING. When removal of unstable material is due to the fault or neglect of the Contractor in his performance of shoring and sheeting, water removal, or other specified requirements, such removal and replacement shall be performed at no additional cost to the government.

3.2 BEDDING

The bedding surface for the pipe shall provide a firm foundation of uniform density throughout the entire length of the pipe.

3.2.1 Corrugated Metal Pipe

Bedding for corrugated metal pipe and pipe arch shall be in accordance with ASTM A 798/A 798M. It is not required to shape the bedding to the pipe geometry. However, for pipe arches, the Contractor shall either shape the bedding to the relatively flat bottom arc or fine grade the foundation to a shallow v-shape. Bedding for corrugated structural plate pipe shall meet requirements of ASTM A 807.

3.2.2 Plastic Pipe

Bedding for PVC and PE pipe shall meet the requirements of ASTM D 2321. Bedding, haunching, and initial backfill shall be either Class IB or II material.

3.3 PLACING PIPE

Each pipe shall be thoroughly examined before being laid; defective or damaged pipe shall not be used. Plastic pipe shall be protected from exposure to direct sunlight prior to laying, if necessary to maintain adequate pipe stiffness and meet installation deflection requirements. Pipelines shall be laid to the grades and alignment indicated. Proper facilities shall be provided for lowering sections of pipe into trenches. Lifting lugs in vertically elongated metal pipe shall be placed in the same vertical plane as the major axis of the pipe. Pipe shall not be laid in water, and pipe shall not be laid when trench conditions or weather are unsuitable for such work. Diversion of drainage or dewatering of trenches during construction shall be provided as necessary. Deflection of installed flexible pipe shall not exceed the following limits:

TYPE OF PIPE	MAXIMUM ALLOWABLE DEFLECTION (%)
Corrugated Steel and Aluminum Alloy	5
Plastic	7.5

Not less than 30 days after the completion of backfilling, the Government may perform a deflection test on the entire length of installed flexible pipe using a mandrel or other suitable device. Installed flexible pipe showing deflections greater than those indicated above shall be retested by a run from the opposite direction. If the retest also fails, the suspect pipe shall be replaced at no cost to the Government.

3.3.1 Concrete, Clay, PVC, Ribbed PVC and Ductile Iron Pipe

Laying shall proceed upgrade with spigot ends of bell-and-spigot pipe and tongue ends of tongue-and-groove pipe pointing in the direction of the flow.

3.3.2 Corrugated PE Pipe

Laying shall be with the separate sections joined firmly on a bed shaped to line and grade and shall follow manufacturer's recommendations.

3.3.3 Corrugated Metal Pipe and Pipe Arch

Laying shall be with the separate sections joined firmly together, with the outside laps of circumferential joints pointing upstream, and with longitudinal laps on the sides. Fully paved steel pipe or pipe arch shall have a painted or otherwise applied label inside the pipe or pipe arch indicating sheet thickness of pipe or pipe arch. Any unprotected metal in the joints shall be coated with polymeric material as specified in AASHTO M 243. Interior coating shall be protected against damage from insertion or removal of struts or tie wires. Lifting lugs shall be used to facilitate moving pipe without damage to exterior or interior coatings. During installation, pipe or pipe arch shall be handled with care to preclude damage to the polymeric coating or paving. Prior to placing backfill, damaged areas of coupling bands and pipe shall be given a coating of polymeric material, as specified in AASHTO M 243. Pipe on which polymeric coating has been damaged to such an extent that satisfactory field repairs cannot be made shall be removed and replaced. Vertical elongation, where indicated, shall be accomplished by factory elongation. Suitable markings or properly placed lifting lugs shall be provided to ensure placement of factory elongated pipe in a vertical plane.

3.3.4 Multiple Culverts

Where multiple lines of pipe are installed, adjacent sides of pipe shall be at least half the nominal pipe diameter or 3 feet apart, whichever is less.

3.4 JOINTING

3.4.1 Corrugated Metal Pipe

3.4.1.1 Field Joints

Transverse field joints shall be designed so that the successive connection of pipe sections will form a continuous line free of appreciable irregularities in the flow line. In addition, the joints shall meet the general performance requirements described in ASTM A 798/A 798M. Suitable transverse field joints which satisfy the requirements for one or more of the joint performance categories can be obtained with the following types of connecting bands furnished with suitable band-end fastening devices: corrugated bands, bands with projections, flat bands, and bands of special design that engage factory reformed ends of corrugated pipe. The space between the pipe and connecting bands shall be kept free from dirt and grit so that corrugations fit snugly. The connecting band, while being tightened, shall be tapped with a soft-head mallet of wood, rubber or plastic, to take up slack and ensure a tight joint. The annular space between abutting sections of part paved, and fully paved pipe and pipe arch, in sizes 30 inches or larger, shall be filled with a polymeric material after jointing. Field joints for each type of corrugated metal pipe shall maintain pipe alignment during construction and prevent infiltration of fill material during the life of the installations. The type, size, and sheet thickness of the band and the size of angles or lugs and bolts shall be as indicated or where not indicated, shall be as specified in the applicable standards or specifications for the pipe.

3.4.1.2 Flexible Watertight, Gasketed Joints

Installation shall be as recommended by the gasket manufacturer for use of lubricants and cements and other special installation requirements. The gasket shall be placed over one end of a section of pipe for half the width of the gasket. The other half shall be doubled over the end of the same pipe. When the adjoining section of pipe is in place, the doubled-over half of the gasket shall then be rolled over the adjoining section. Any unevenness in overlap shall be corrected so that the gasket covers the end of pipe sections equally. Connecting bands shall be centered over adjoining sections of pipe, and rods or bolts placed in position and nuts tightened. Band Tightening: The band shall be tightened evenly, even tension being kept on the rods or bolts, and the gasket; the gasket shall seat properly in the corrugations. Watertight joints shall remain uncovered for a period of time designated, and before being covered, tightness of the nuts shall be measured with a torque wrench. If the nut has tended to loosen its grip on the bolts or rods, the nut shall be retightened with a torque wrench and remain uncovered until a tight, permanent joint is assured.

3.5 DRAINAGE STRUCTURES

3.5.1 Manholes and Inlets

Construction shall be of reinforced concrete, plain concrete, brick, precast reinforced concrete, precast concrete segmental blocks, prefabricated corrugated metal, or polymeric coated corrugated metal; complete

with frames and covers or gratings; and with fixed galvanized steel ladders where indicated. Pipe studs and junction chambers of prefabricated corrugated metal manholes shall be fully polymeric-coated when the connecting branch lines are so treated.

3.5.2 Walls and Headwalls

Construction shall be as indicated.

3.6 STEEL LADDER INSTALLATION

Ladder shall be adequately anchored to the wall by means of steel inserts spaced not more than 6 feet vertically, and shall be installed to provide at least 6 inches of space between the wall and the rungs. The wall along the line of the ladder shall be vertical for its entire length.

3.7 BACKFILLING

3.7.1 Backfilling Pipe in Trenches

After the pipe has been properly bedded, selected material from excavation or borrow, at a moisture content that will facilitate compaction, shall be placed along both sides of pipe in layers not exceeding 6 inches in compacted depth. The backfill shall be brought up evenly on both sides of pipe for the full length of pipe. The fill shall be thoroughly compacted under the haunches of the pipe. Each layer shall be thoroughly compacted with mechanical tampers or rammers. This method of filling and compacting shall continue until the fill has reached an elevation of at least 12 inches above the top of the pipe. The remainder of the trench shall be backfilled and compacted by spreading and rolling or compacted by mechanical rammers or tampers in layers not exceeding 8 inches. Tests for density shall be made as necessary to ensure conformance to the compaction requirements specified below. Where it is necessary, in the opinion of the Contracting Officer, that sheeting or portions of bracing used be left in place, the contract will be adjusted accordingly. Untreated sheeting shall not be left in place beneath structures or pavements.

3.7.2 Backfilling Pipe in Fill Sections

For pipe placed in fill sections, backfill material and the placement and compaction procedures shall be as specified below. The fill material shall be uniformly spread in layers longitudinally on both sides of the pipe, not exceeding 6 inches in compacted depth, and shall be compacted by rolling parallel with pipe or by mechanical tamping or ramming. Prior to commencing normal filling operations, the crown width of the fill at a height of 12 inches above the top of the pipe shall extend a distance of not less than twice the outside pipe diameter on each side of the pipe or 12 feet, whichever is less. After the backfill has reached at least 12 inches above the top of the pipe, the remainder of the fill shall be placed and thoroughly compacted in layers not exceeding 8 inches.

3.7.3 Movement of Construction Machinery

When compacting by rolling or operating heavy equipment parallel with the pipe, displacement of or injury to the pipe shall be avoided. Movement of construction machinery over a culvert or storm drain at any stage of construction shall be at the Contractor's risk. Any damaged pipe shall be repaired or replaced.

3.7.4 Compaction

3.7.4.1 General Requirements

Cohesionless materials include gravels, gravel-sand mixtures, sands, and gravelly sands. Cohesive materials include clayey and silty gravels, gravel-silt mixtures, clayey and silty sands, sand-clay mixtures, clays, silts, and very fine sands. When results of compaction tests for moisture-density relations are recorded on graphs, cohesionless soils will show straight lines or reverse-shaped moisture-density curves, and cohesive soils will show normal moisture-density curves.

3.7.4.2 Minimum Density

Backfill over and around the pipe and backfill around and adjacent to drainage structures shall be compacted at the approved moisture content to the following applicable minimum density, which will be determined as specified below.

a. Under airfield and heliport pavements, paved roads, streets, parking areas, and similar-use pavements including adjacent shoulder areas, the density shall be not less than 90 percent of maximum density for cohesive material and 95 percent of maximum density for cohesionless material, up to the elevation where requirements for pavement subgrade materials and compaction shall control.

b. Under unpaved or turfed traffic areas, density shall not be less than 90 percent of maximum density for cohesive material and 95 percent of maximum density for cohesionless material.

c. Under nontraffic areas, density shall be not less than that of the surrounding material.

3.7.5 Determination of Density

Testing shall be the responsibility of the Contractor and performed at no additional cost to the Government. Testing shall be performed by an approved commercial testing laboratory or by the Contractor subject to approval. Tests shall be performed in sufficient number to ensure that specified density is being obtained. Laboratory tests for moisture-density relations shall be made in accordance with ASTM D 1557 except that mechanical tampers may be used provided the results are correlated with those obtained with the specified hand tamper. Field density tests shall be determined in accordance with ASTM D 2167 or ASTM D 2922. When ASTM D 2922 is used, the calibration curves shall be checked and adjusted, if necessary, using the sand cone method as described in paragraph Calibration of the referenced publications. ASTM D 2922 results in a wet unit weight of soil and when using this method ASTM D 3017 shall be used to determine the moisture content of the soil. The calibration curves furnished with the moisture gauges shall be checked along with density calibration checks as described in ASTM D 3017 or ASTM D 2922. Test results shall be furnished the Contracting Officer. The calibration checks of both the density and moisture gauges shall be made at the beginning of a job on each different type of

material encountered and at intervals as directed.

3.8 PIPELINE TESTING

Lines shall be tested for leakage by low pressure air or water testing or exfiltration tests, as appropriate. Low pressure air testing for vitrified clay pipes shall conform to ASTM C 828. Low pressure air testing for plastic pipe shall conform to ASTM F 1417. Low pressure air testing procedures for other pipe materials shall use the pressures and testing times prescribed in ASTM C 828 or ASTM C 924, after consultation with the pipe manufacturer. Testing of individual joints for leakage by low pressure air or water shall conform to ASTM C 1103. Prior to exfiltration tests, the trench shall be backfilled up to at least the lower half of the pipe. If required, sufficient additional backfill shall be placed to prevent pipe movement during testing, leaving the joints uncovered to permit inspection. Visible leaks encountered shall be corrected regardless of leakage test results. When the water table is 2 feet or more above the top of the pipe at the upper end of the pipeline section to be tested, infiltration shall be measured using a suitable weir or other device acceptable to the Contracting Officer. An exfiltration test shall be made by filling the line to be tested with water so that a head of at least 2 feet is provided above both the water table and the top of the pipe at the upper end of the pipeline to be tested. The filled line shall be allowed to stand until the pipe has reached its maximum absorption, but not less than 4 hours. After absorption, the head shall be reestablished. The amount of water required to maintain this water level during a 2-hour test period shall be measured. Leakage as measured by the exfiltration test shall not exceed 0.2 gallons per inch in diameter per 100 feet of pipeline per hour. When leakage exceeds the maximum amount specified, satisfactory correction shall be made and retesting accomplished. Testing, correcting, and retesting shall be made at no additional cost to the Government.

-- End of Section --

SECTION 02921

SEEDING
06/98

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AGRICULTURAL MARKETING SERVICE (AMS)

AMS-01	(Aug 95) Federal Seed Act Regulations Part 201

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 602	(1995a) Agricultural Liming Materials
ASTM D 4972	(1995a) pH of Soils
ASTM D 5268	(1992; R 1996) Topsoil Used for Landscaping Purposes
ASTM D 5883	(1996) Standard Guide for Use of Rotary Kiln Produced Expanded Shale, Clay or Slate (ESCS) as a Mineral Amendment in Topsoil Used for Landscaping and Related Purposes

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Equipment; GA. Surface Erosion Control Material; GA. Chemical Treatment Material; GA.

Manufacturer's literature including physical characteristics, application and installation instructions for equipment, surface erosion control material and chemical treatment material.

SD-07 Schedules

Equipment; GA.

A listing of equipment to be used for the seeding operation.

SD-08 Statements

Delivery; GA.

Delivery schedule.

Finished Grade and Topsoil; GA.

Finished grade status.

Topsoil; GA.

Availability of topsoil from the stripping and stock piling operation.

SD-09 Reports

Equipment Calibration; GA.

Certification of calibration tests conducted on the equipment used in the seeding operation.

Soil Test; GA.

Certified reports of inspections and laboratory tests, prepared by an independent testing agency, including analysis and interpretation of test results. Each report shall be properly identified. Test methods used and compliance with recognized test standards shall be described.

SD-13 Certificates

Seed; GA. Topsoil; GA. pH Adjuster; GA. Fertilizer; GA. Organic Material; GA. Soil Conditioner; GA. Mulch; GA. Pesticide; FIO.

Prior to the delivery of materials, certificates of compliance attesting that materials meet the specified requirements. Certified copies of the material certificates shall include the following:

a. Seed. Classification, botanical name, common name, percent pure live seed, minimum percent germination and hard seed, maximum percent weed seed content, and date tested.

b. Topsoil. Particle size, pH, organic matter content, textural class, soluble salts, chemical and mechanical analyses.

c. pH Adjuster. Calcium carbonate equivalent and sieve analysis.

d. Fertilizer. Chemical analysis and composition percent.

e. Organic Material: Composition and source.

f. Soil Conditioner: Composition and source.

g. Mulch: Composition and source.

h. Pesticide. EPA registration number and registered uses.

SD-14 Samples

Delivered Topsoil; GA.

Samples taken from several locations at the source.

Soil Amendments; GA.

A 10 pound sample.

Mulch; GA.

A 10 pound sample.

SD-18 Records

Quantity Check; GA.

Bag count or bulk weight measurements of material used compared with area covered to determine the application rate and quantity installed.

Seed Establishment Period; GA.

Calendar time period for the seed establishment period. When there is more than one seed establishment period, the boundaries of the seeded area covered for each period shall be described.

Maintenance Record; GA.

Maintenance work performed, area repaired or reinstalled, diagnosis for unsatisfactory stand of grass plants.

Application of Pesticide; FIO.

Pesticide treatment plan with sequence of treatment work with dates and times. The pesticide trade name, EPA registration number, chemical composition, formulation, concentration of original and diluted material, application rate of active ingredients, method of application, area treated, amount applied; and the name and state license number of the state certified applicator shall be included.

1.3 SOURCE INSPECTION

The source of delivered topsoil shall be subject to inspection.

1.4 DELIVERY, INSPECTION, STORAGE, AND HANDLING

1.4.1 Delivery

A delivery schedule shall be provided at least 10 calendar days prior to the first day of delivery.

1.4.1.1 Delivered Topsoil

Prior to the delivery of any topsoil, its availability shall be verified in paragraph TOPSOIL. A soil test shall be provided for topsoil delivered to the site.

1.4.1.2 Soil Amendments

Soil amendments shall be delivered to the site in the original, unopened containers bearing the manufacturer's chemical analysis. In lieu of containers, soil amendments may be furnished in bulk. A chemical analysis shall be provided for bulk deliveries.

1.4.1.3 Pesticides

Pesticide material shall be delivered to the site in the original, unopened containers bearing legible labels indicating the EPA registration number and the manufacturer's registered uses.

1.4.2 Inspection

Seed shall be inspected upon arrival at the job site for conformity to species and quality. Seed that is wet, moldy, or bears a test date five months or older, shall be rejected. Other materials shall be inspected for compliance with specified requirements. The following shall be rejected: open soil amendment containers or wet soil amendments; topsoil that contains slag, cinders, stones, lumps of soil, sticks, roots, trash or other material over a minimum 1-1/2 inch diameter; and topsoil that contains viable plants and plant parts. Unacceptable materials shall be removed from the job site.

1.4.3 Storage

Materials shall be stored in designated areas. Seed, lime, and fertilizer shall be stored in cool, dry locations away from contaminants. Chemical treatment material shall be stored according to manufacturer's instructions and not with seeding operation materials.

1.4.4 Handling

Except for bulk deliveries, materials shall not be dropped or dumped from vehicles.

1.4.5 Time Limitation

Hydroseeding time limitation for holding seed in the slurry shall be a maximum 24 hours.

PART 2 PRODUCTS

2.1 SEED

2.1.1 Seed Classification

State-approved seed of the latest season's crop shall be provided in original sealed packages bearing the producer's guaranteed analysis for percentages of mixture, purity, germination, hard seed, weed seed content, and inert material. Labels shall be in conformance with AMS-01 and applicable state seed laws.

2.1.2 Permanent Seed Species and Mixtures

Permanent seed species and mixtures shall be proportioned by weight as follows:

Botanical Name	Common Name	Mixture Percent by Weight	Pounds Pure Live Seed/acre
Panicum virgatum; Pathfinder varity	Blackwell Switchgrass	100	15

2.1.3 Quality

Weed seed shall be a maximum 1 percent by weight of the total mixture.

2.1.4 Seed Mixing

The mixing of seed may be done by the seed supplier prior to delivery, or on site as directed.

2.1.5 Substitutions

Substitutions will not be allowed without written request and approval from the Contracting Officer.

2.2 TOPSOIL

Topsoil shall be as defined in ASTM D 5268. When available, the topsoil shall be the existing surface soil stripped and stockpiled onsite. When additional topsoil is required beyond the available topsoil from the stripping operation, topsoil shall be delivered and amended as recommended by the soil test for the seed specified. Topsoil shall be free from slag, cinders, stones, lumps of soil, sticks, roots, trash or other material over a minimum 1-1/2 inch diameter. Topsoil shall be free from viable plants and plant parts.

2.3 SOIL AMENDMENTS

Soil amendments shall consist of pH adjuster, fertilizer, organic material and soil conditioners meeting the following requirements. Vermiculite shall not be used.

2.3.1 pH Adjuster

The pH adjuster shall be an agricultural liming material in accordance with ASTM C 602. These materials may be burnt lime, hydrated lime, ground limestone, sulfur, or shells. The pH adjuster shall be used to create a favorable soil pH for the plant material specified.

2.3.1.1 Limestone

Limestone material shall contain a minimum calcium carbonate equivalent of 80 percent. Gradation: A minimum 95 percent shall pass through a No. 8 sieve and a minimum 55 percent shall pass through a No. 60 sieve. To raise soil pH, ground limestone shall be used.

2.3.1.2 Hydrated Lime

Hydrated lime shall contain a minimum calcium carbonate equivalent of 110 percent. Gradation: A minimum 100 percent shall pass through a No. 8 sieve and a minimum 97 percent shall pass through a No. 60 sieve.

2.3.1.3 Burnt Lime

Burnt lime shall contain a minimum calcium carbonate equivalent of 140 percent. Gradation: A minimum 95 percent shall pass through a No. 8 sieve and a minimum 35 percent shall pass through a No. 60 sieve.

2.3.2 Fertilizer

Fertilizer shall consist of a 2:1:1 ratio (nitrogen, phosphorous, potassium) which will supply the pounds of available nitrogen per acre as required by the soil test described in section 3.1.4 of this specification. Fertilizer shall be controlled release commercial grade, free flowing, uniform in composition, and consist of a nitrogen-phosphorus-potassium ratio. The fertilizer shall be derived from sulphur coated urea, urea formaldehyde, plastic or polymer coated pills, or isobutylenediurea (IBDU). Fertilizer shall be balanced with the inclusion of trace minerals and micro-nutrients.

2.3.3 Organic Material

Organic material shall consist of either bonemeal, rotted manure, decomposed wood derivatives, recycled

compost, or worm castings.

2.3.3.1 Bonemeal

Bonemeal shall be finely ground, steamed bone product containing from 2 to 4 percent nitrogen and 16 to 40 percent phosphoric acid.

2.3.3.2 Rotted Manure

Rotted manure shall be unleached horse, chicken or cattle manure containing a maximum 25 percent by volume of straw, sawdust, or other bedding materials. It shall contain no chemicals or ingredients harmful to plants. The manure shall be heat treated to kill weed seeds and be free of stones, sticks, and soil.

2.3.3.3 Decomposed Wood Derivatives

Decomposed wood derivatives shall be ground bark, sawdust, yard trimmings, or other wood waste material that is free of stones, sticks, soil, and toxic substances harmful to plants, and is fully composted or stabilized with nitrogen.

2.3.3.4 Recycled Compost

Compost shall be a well decomposed, stable, weed free organic matter source. Compost shall be derived from food; agricultural or industrial residuals; biosolids (treated sewage sludge); yard trimmings; or source-separated or mixed solid waste. The compost shall possess no objectionable odors and shall not resemble the raw material from which it was derived. The material shall not contain substances toxic to plants. Gradation: The compost material shall pass through a 3/8 inch screen, possess a pH of 5.5 to 8.0, and have a moisture content between 35-55 percent by weight. The material shall not contain more than 1 percent by weight of man-made foreign matter. Compost shall be cleaned of plastic materials larger than 2 inches in length.

2.3.3.5 Worm Castings

Worm castings shall be screened from worms and food source, and shall be commercially packaged.

2.3.4 Soil Conditioner

Soil conditioner shall be sand, super absorbent polymers, calcined clay, or gypsum for use singly or in combination to meet the requirements of the soil test.

2.3.4.1 Sand

Sand shall be clean and free of toxic materials. Gradation: A minimum 95 percent by weight shall pass a No. 10 sieve and a minimum 10 percent by weight shall pass a No. 16 sieve. Greensand shall be balanced with the inclusion of trace minerals and nutrients.

2.3.4.2 Super Absorbent Polymers

To improve water retention in soils, super absorbent polymers shall be sized and applied according to the manufacturer's recommendations. Polymers shall be added as a soil amendment and be cross-linked polyacrylamide, with an absorption capacity of 250-400 times its weight. Polymers shall also be added to the seed and be a starch grafted polyacrylonitrite, with graphite added as a tacky sticker. It shall have an absorption capacity of 100 plus times its weight.

2.3.4.3 Calcined Clay

Calcined clay shall be granular particles produced from montmorillonite clay calcined to a minimum temperature of 1200 degrees F. Gradation: A minimum 90 percent shall pass a No. 8 sieve; a minimum 99 percent shall be retained on a No. 60 sieve; and a maximum 2 percent shall pass a No. 100 sieve. Bulk density: A maximum 40 pounds per cubic foot.

2.3.4.4 Gypsum

Gypsum shall be commercially packaged, free flowing, and a minimum 95 percent calcium sulfate by volume.

2.3.4.5 Expanded Shale, Clay, or Slate (ESCS)

Rotary kiln produced ESCS material shall be in conformance with ASTM D 5883.

2.4 MULCH

Mulch shall be free from weeds, mold, and other deleterious materials. Mulch materials shall be native to the region.

2.4.1 Straw

Straw shall be stalks from oats, wheat, rye, barley, or rice, furnished in air-dry condition and with a consistency for placing with commercial mulch-blowing equipment.

2.4.2 Hay

Hay shall be native hay, sudan-grass hay, broomsedge hay, or other herbaceous mowings, furnished in an air-dry condition suitable for placing with commercial mulch-blowing equipment.

2.4.3 Wood Cellulose Fiber

Wood cellulose fiber shall not contain any growth or germination-inhibiting factors and shall be dyed an appropriate color to facilitate placement during application. Composition on air-dry weight basis: 9 to 15 percent moisture, pH range from 4.5 to 6.0.

2.4.4 Paper Fiber

Paper fiber mulch shall be recycled news print that is shredded for the purpose of mulching seed.

2.5 WATER

Water shall be the responsibility of the Contractor, unless otherwise noted. Water shall not contain elements toxic to plant life.

2.6 PESTICIDE

Pesticide shall be insecticide, herbicide, fungicide, nematocide, rodenticide or miticide. For the purpose of this specification, a soil fumigant shall have the same requirements as a pesticide. The pesticide material shall be EPA registered and approved.

2.7 SURFACE EROSION CONTROL MATERIAL

Surface erosion control material shall conform to the following:

2.7.1 Surface Erosion Control Blanket

Blanket shall be machine produced mat of wood excelsior formed from a web of interlocking wood fibers; covered on one side with either knitted straw blanket-like mat construction; covered with biodegradable plastic mesh; or interwoven biodegradable thread, plastic netting, or twisted kraft paper cord netting.

2.7.2 Surface Erosion Control Fabric

Fabric shall be knitted construction of polypropylene yarn with uniform mesh openings 3/4 to 1 inch square with strips of biodegradable paper. Filler paper strips shall have a minimum life of 6 months.

2.7.3 Surface Erosion Control Net

Net shall be heavy, twisted jute mesh, weighing approximately 1.22 pounds per linear yard and 4 feet wide with mesh openings of approximately 1 inch square.

2.7.4 Surface Erosion Control Chemicals

Chemicals shall be high-polymer synthetic resin or cold-water emulsion of selected petroleum resins.

2.7.5 Hydrophilic Colloids

Hydrophilic colloids shall be physiologically harmless to plant and animal life without phytotoxic agents. Colloids shall be naturally occurring, silicate powder based, and shall form a water insoluble membrane after curing. Colloids shall resist mold growth.

2.7.6 Erosion Control Material Anchors

Erosion control anchors shall be as recommended by the manufacturer.

PART 3 EXECUTION

3.1 INSTALLING SEED TIME AND CONDITIONS

3.1.1 Seeding Time

Seed shall be installed from the time the frost leaves the ground to May 15 for spring establishment and from October 1 to the time the frost enters the ground for fall establishment.

3.1.2 Seeding Conditions

Seeding operations shall be performed only during periods when beneficial results can be obtained. When drought, excessive moisture, or other unsatisfactory conditions prevail, the work shall be stopped when directed. When special conditions warrant a variance to the seeding operations, proposed alternate times shall be submitted for approval.

3.1.3 Equipment Calibration

Immediately prior to the commencement of seeding operations, calibration tests shall be conducted on the equipment to be used. These tests shall confirm that the equipment is operating within the manufacturer's specifications and will meet the specified criteria. The equipment shall be calibrated a minimum of once every day during the operation. The calibration test results shall be provided within 1 week of testing.

3.1.4 Soil Test

Delivered topsoil, existing soil in smooth graded areas, and stockpiled topsoil shall be tested in accordance with ASTM D 5268 and ASTM D 4972 for determining the particle size, pH, organic matter content, textural class, chemical analysis, soluble salts analysis, and mechanical analysis. Sample collection on site shall be random over the entire site. Sample collection for stockpiled topsoil shall be at different levels in the stockpile. The soil shall be free from debris, noxious weeds, toxic substances, or other materials harmful to plant growth. The test shall determine the quantities and type of soil amendments required to meet local growing conditions for the seed species specified.

3.2 SITE PREPARATION

3.2.1 Finished Grade and Topsoil

The Contractor shall verify that finished grades are as indicated on drawings, and the placing of topsoil, smooth grading, and compaction requirements have been completed in accordance with Section 02331 LEVEE CONSTRUCTION, prior to the commencement of the seeding operation.

3.2.2 Application of Soil Amendments

3.2.2.1 Applying pH Adjuster

The pH adjuster shall be applied as recommended by the soil test. The pH adjuster shall be incorporated into the soil to a maximum 4 inch depth or may be incorporated as part of the tillage operation.

3.2.2.2 Applying Fertilizer

The fertilizer shall be applied as recommended by the soil test. Fertilizer shall be incorporated into the soil to a maximum 4 inch depth or may be incorporated as part of the tillage or hydroseeding operation.

3.2.2.3 Applying Soil Conditioner

The soil conditioner shall be as recommended by the soil test. The soil conditioner shall be spread uniformly over the soil a minimum 1 inch depth and thoroughly incorporated by tillage into the soil to a maximum 4 inch depth.

3.2.2.4 Applying Super Absorbent Polymers

Polymers shall be spread uniformly over the soil as recommended by the manufacturer and thoroughly incorporated by tillage into the soil to a maximum 4 inch depth.

3.2.3 Tillage

Soil on slopes up to a maximum 3-horizontal-to-1-vertical shall be tilled to a minimum 4 inch depth. On slopes between 3-horizontal-to-1-vertical and 1-horizontal-to-1 vertical, the soil shall be tilled to a minimum 2 inch depth by scarifying with heavy rakes, or other method. Rototillers shall be used where soil conditions and length of slope permit. On slopes 1-horizontal-to-1 vertical and steeper, no tillage is required. Drainage patterns shall be maintained as indicated on drawings. Areas compacted by construction operations shall be completely pulverized by tillage. Soil used for repair of surface erosion or grade deficiencies shall conform to topsoil requirements. The pH adjuster, fertilizer, and soil conditioner may be applied during this procedure.

3.2.4 Prepared Surface

3.2.4.1 Preparation

The prepared surface shall be a maximum 1 inch below the adjoining grade of any surfaced area. New surfaces shall be blended to existing areas. The prepared surface shall be completed with a light raking to remove debris.

3.2.4.2 Lawn Area Debris

Debris and stones over a minimum 5/8 inch in any dimension shall be removed from the surface.

3.2.4.3 Field Area Debris

Debris and stones over a minimum 3 inch in any dimension shall be removed from the surface.

3.2.4.4 Protection

Areas with the prepared surface shall be protected from compaction or damage by vehicular or pedestrian traffic and surface erosion.

3.3 INSTALLATION

Prior to installing seed, any previously prepared surface compacted or damaged shall be reworked to meet the requirements of paragraph SITE PREPARATION. Any surfaces disturbed for construction operations shall be revegetated in accordance with this specification. Seeding operations shall not take place when the wind velocity will prevent uniform seed distribution.

3.3.1 Installing Seed

Seeding method shall be Drill Seeding. Seeding procedure shall ensure even coverage. Gravity feed applicators, which drop seed directly from a hopper onto the prepared soil, shall not be used because of the difficulty in achieving even coverage, unless otherwise approved. Absorbent polymer powder shall be mixed with the dry seed at the rate recommended by the manufacturer.

3.3.1.1 Broadcast Seeding

Seed shall be uniformly broadcast at the rate of 0.68 pounds per 1000 square feet using broadcast seeders. Half the total rate of seed application shall be broadcast in 1 direction, with the remainder of the seed rate broadcast at 90 degrees from the first direction. Seed shall be covered a maximum 1/4 inch depth by disk harrow, steel mat drag, cultipacker, or other approved device.

3.3.1.2 Drill Seeding

Seed shall be uniformly drilled to a maximum 1/2 inch depth and at the rate of 0.34 pounds per 1000 square feet, using equipment having drills a maximum 7 inches distance apart. Row markers shall be used with the drill seeder. Half the total rate of seed application shall be drilled in 1 direction, with the remainder of the seed rate drilled at 90 degrees from the first direction. The drilling equipment shall be maintained with half full seed boxes during the seeding operations.

3.3.1.3 Rolling

The entire area shall be firmed with a roller not exceeding 90 pounds per foot roller width. Slopes over a maximum 3-horizontal-to-1 vertical shall not be rolled. Areas seeded with seed drills equipped

with rollers shall not be rolled.

3.3.2 Hydroseeding

Seed shall be mixed to ensure broadcast at the rate of 0.68 pounds per 1000 square feet. Seed and fertilizer shall be added to water and thoroughly mixed to meet the rates specified. The time period for the seed to be held in the slurry shall be a maximum 24 hours. Wood cellulose fiber mulch and tackifier shall be added at the rates recommended by the manufacturer after the seed, fertilizer, and water have been thoroughly mixed to produce a homogeneous slurry. Slurry shall be uniformly applied under pressure over the entire area. The hydroseeded area shall not be rolled.

3.3.3 Mulching

3.3.3.1 Hay or Straw Mulch

Hay or straw mulch shall be spread uniformly at the rate of 2 tons per acre. Mulch shall be spread by hand, blower-type mulch spreader, or other approved method. Mulching shall be started on the windward side of relatively flat areas or on the upper part of steep slopes, and continued uniformly until the area is covered. The mulch shall not be bunched or clumped. Sunlight shall not be completely excluded from penetrating to the ground surface. All areas installed with seed shall be mulched on the same day as the seeding. Mulch shall be anchored immediately following spreading.

3.3.3.2 Mechanical Anchor

Mechanical anchor shall be a V-type-wheel land packer; a scalloped-disk land packer designed to force mulch into the soil surface; or other suitable equipment.

3.3.3.3 Non-Asphaltic Tackifier

Hydrophilic colloid shall be applied at the rate recommended by the manufacturer, using hydraulic equipment suitable for thoroughly mixing with water. A uniform mixture shall be applied over the area.

3.3.3.4 Wood Cellulose Fiber, Paper Fiber, and Recycled Paper

Wood cellulose fiber, paper fiber, or recycled paper shall be applied as part of the hydroseeding operation. The mulch shall be mixed and applied in accordance with the manufacturer's recommendations.

3.3.4 Watering Seed

Watering shall be started immediately after completing the seeding of an area. Water shall be applied to supplement rainfall at a rate sufficient to ensure moist soil conditions to a minimum 1 inch depth. Run-off and puddling shall be prevented. Watering trucks shall not be driven over turf areas, unless otherwise directed. Watering of other adjacent areas or plant material shall be prevented.

3.4 SURFACE EROSION CONTROL

3.4.1 Surface Erosion Control Material

Where indicated or as directed, surface erosion control material shall be installed in accordance with manufacturer's instructions. Placement of the material shall be accomplished without damage to installed material or without deviation to finished grade.

3.4.2 Temporary Seeding

When directed during contract delays affecting the seeding operation or when a quick cover is required to prevent surface erosion, the areas designated shall be seeded in accordance with temporary seed species listed under Paragraph SEED.

3.4.2.1 Soil Amendments

When soil amendments have not been applied to the area, the quantity of 1/2 of the required soil amendments shall be applied and the area tilled in accordance with paragraph SITE PREPARATION. The area shall be watered in accordance with paragraph Watering Seed.

3.4.2.2 Remaining Soil Amendments

The remaining soil amendments shall be applied in accordance with the paragraph Tillage when the surface is prepared for installing seed.

3.5 QUANTITY CHECK

For materials provided in bags, the empty bags shall be retained for recording the amount used. For materials provided in bulk, the weight certificates shall be retained as a record of the amount used. The amount of material used shall be compared with the total area covered to determine the rate of application used. Differences between the quantity applied and the quantity specified shall be adjusted as directed.

3.6 APPLICATION OF PESTICIDE

When application of a pesticide becomes necessary to remove a pest or disease, a pesticide treatment plan shall be submitted and coordinated with the installation pest management program.

3.6.1 Technical Representative

The certified installation pest management coordinator shall be the technical representative, and shall be present at all meetings concerning treatment measures for pest or disease control. They may be present during treatment application.

3.6.2 Application

A state certified applicator shall apply required pesticides in accordance with EPA label restrictions and recommendations. Clothing and personal protective equipment shall be used as specified on the pesticide label. A closed system is recommended as it prevents the pesticide from coming into contact with the applicator or other persons. Water for formulating shall only come from designated locations. Filling hoses shall be fitted with a backflow preventer meeting local plumbing codes or standards. Overflow shall be prevented during the filling operation. Prior to each day of use, the equipment used for applying pesticide shall be inspected for leaks, clogging, wear, or damage. Any repairs are to be performed immediately. A pesticide plan shall be submitted.

3.7 RESTORATION AND CLEAN UP

3.7.1 Restoration

Existing turf areas, pavements, and facilities that have been damaged from the seeding operation shall be restored to original condition at Contractor's expense.

3.7.2 Clean Up

Excess and waste material shall be removed from the seeded areas and shall be disposed offsite. Adjacent paved areas shall be cleaned.

3.8 PROTECTION OF INSTALLED AREAS

Immediately upon completion of the seeding operation in an area, the area shall be protected against traffic or other use by erecting barricades and providing signage as required, or as directed.

3.9 SEED ESTABLISHMENT PERIOD

3.9.1 Commencement

The seed establishment period to obtain a healthy stand of grass plants shall begin on the first day of work under this contract and shall end 3 months after the last day of the seeding operation. Written calendar time period shall be furnished for the seed establishment period. When there is more than 1 seed establishment period, the boundaries of the seeded area covered for each period shall be described. The seed establishment period shall be modified for inclement weather, shut down periods, or for separate completion dates of areas as approved by the Contracting Officer.

3.9.2 Satisfactory Stand of Grass Plants

Grass plants shall be evaluated for species and health when the grass plants are a minimum 1 inch high.

3.9.2.1 Lawn Area

A satisfactory stand of grass plants from the seeding operation for a lawn area shall be a minimum 20 grass plants per square foot. Bare spots shall be a maximum 6 inches square. The total bare spots shall be a maximum 2 percent of the total seeded area.

3.9.2.2 Field Area

A satisfactory stand of grass plants from the seeding operation for a field area shall be a minimum 10 grass plants per square foot. The total bare spots shall not exceed 2 percent of the total seeded area.

3.9.3 Maintenance During Establishment Period

Maintenance of the seeded areas shall include eradicating weeds, insects and diseases; protecting embankments and ditches from surface erosion; maintaining erosion control materials and mulch; protecting installed areas from traffic; mowing; watering; and post-fertilization.

3.9.3.1 Mowing

a. Lawn Areas: Lawn areas shall be mowed to a minimum 3 inch height when the turf is a maximum 4 inches high. Clippings shall be removed when the amount cut prevents sunlight from reaching the ground surface.

b. Field Areas: Field areas shall be mowed once during the season to a minimum 3 inch height. Clippings shall be removed when the amount cut prevents sunlight from reaching the ground surface.

3.9.3.2 Post-Fertilization

The fertilizer shall be applied as recommended by the soil test. A maximum 1/2 pound per 1000 square feet of actual available nitrogen shall be provided to the grass plants. The application shall be timed prior to the advent of winter dormancy and shall be made without burning the installed grass plants.

3.9.3.3 Pesticide Treatment

Treatment for disease or pest shall be in accordance with paragraph APPLICATION OF PESTICIDE.

3.9.3.4 Repair or Reinstall

Unsatisfactory stand of grass plants and mulch shall be repaired or reinstalled, and eroded areas shall be repaired in accordance with paragraph SITE PREPARATION.

3.9.3.5 Maintenance Record

A record of each site visit shall be furnished, describing the maintenance work performed; areas repaired or reinstalled; and diagnosis for unsatisfactory stand of grass plants.

-- End of Section --

SECTION 03200

CONCRETE REINFORCEMENT
09/97

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ACI INTERNATIONAL (ACI)

ACI 318/318R	(1995) Building Code Requirements for Structural Concrete and Commentary

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 53	(1999) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A 82	(1997a) Steel Wire, Plain, for Concrete Reinforcement
ASTM A 184/A 184M	(1996) Fabricated Deformed Steel Bar Mats for Concrete Reinforcement
ASTM A 185	(1997) Steel Welded Wire Fabric, Plain, for Concrete Reinforcement
ASTM A 615/A 615M	(1996a) Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
ASTM A 675/A 675M	(1990a; R 1995e1) Steel Bars, Carbon, Hot-Wrought, Special Quality, Mechanical Properties
ASTM A 706/A 706M	(1998) Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
ASTM A 767/A 767M	(1997) Zinc-Coated (Galvanized) Steel Bars in Concrete Reinforcement
ASTM A 775/A 775M	(1997e1) Epoxy-Coated Reinforcement Steel Bars
ASTM A 884/A 884M	(1996ae1) Epoxy-Coated Steel Wire and Welded Wire Fabric for Reinforcement
ASTM C 1116	(1995) Fiber-Reinforced Concrete and Shotcrete

AMERICAN WELDING SOCIETY (AWS)

AWS D1.4	(1998) Structural Welding Code - Reinforcing Steel

CONCRETE REINFORCING STEEL INSTITUTE (CRSI)

CRSI MSP-1	(1996) Manual of Standard Practice

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-04 Drawings

Concrete Reinforcement System; GA.

Detail drawings showing reinforcing steel placement, schedules, sizes, grades, and splicing and bending details. Drawings shall show support details including types, sizes and spacing.

SD-08 Statements

Welding; GA.

A list of qualified welders names.

SD-13 Certificates

Reinforcing Steel; GA.

Certified copies of mill reports attesting that the reinforcing steel furnished contains no less than 25 percent recycled scrap steel and meets the requirements specified herein, prior to the installation of reinforcing steel.

1.3 WELDING

Welders shall be qualified in accordance with AWS D1.4. Qualification test shall be performed at the worksite and the Contractor shall notify the Contracting Officer 24 hours prior to conducting tests.

Special welding procedures and welders qualified by others may be accepted as permitted by AWS D1.4.

1.4 DELIVERY AND STORAGE

Reinforcement and accessories shall be stored off the ground on platforms, skids, or other supports.

PART 2 PRODUCTS

2.1 DOWELS

Dowels shall conform to ASTM A 675/A 675M, Grade 80. Steel pipe conforming to ASTM A 53, Schedule 80, may be used as dowels provided the ends are closed with metal or plastic inserts or with mortar.

2.2 FABRICATED BAR MATS

Fabricated bar mats shall conform to ASTM A 184/A 184M.

2.3 REINFORCING STEEL

Reinforcing steel shall be deformed bars conforming to ASTM A 615/A 615M or ASTM A 706/A 706M, grades and sizes as indicated. Cold drawn wire used for spiral reinforcement shall conform to ASTM A 82. In highly corrosive environments or when directed by the Contracting Officer, reinforcing steel shall conform to ASTM A 767/A 767M or ASTM A 775/A 775M as appropriate.

2.4 WELDED WIRE FABRIC

Welded wire fabric shall conform to ASTM A 185. When directed by the Contracting Officer for special applications, welded wire fabric shall conform to ASTM A 884/A 884M.

2.5 WIRE TIES

Wire ties shall be 16 gauge or heavier black annealed steel wire.

2.6 SUPPORTS

Bar supports for formed surfaces shall be designed and fabricated in accordance with CRSI MSP-1 and shall be steel or precast concrete blocks. Precast concrete blocks shall have wire ties and shall be not less than 4 inches square when supporting reinforcement on ground. Precast concrete block shall have compressive strength equal to that of the surrounding concrete. Where concrete formed surfaces will be exposed to weather or where surfaces are to be painted, steel supports within 1/2 inch of concrete surface shall be galvanized, plastic protected or of stainless steel. Concrete supports used in concrete exposed to view shall have the same color and texture as the finish surface. For slabs on grade, supports shall be precast concrete blocks, plastic coated steel fabricated with bearing plates, or specifically designed wire-fabric supports fabricated of plastic.

2.7 SYNTHETIC FIBER REINFORCEMENT

Synthetic fiber shall be polypropylene with a denier less than 100 and a nominal fiber length of 2 inches.

PART 3 EXECUTION

3.1 REINFORCEMENT

Reinforcement shall be fabricated to shapes and dimensions shown and shall conform to the requirements of ACI 318/318R. Reinforcement shall be cold bent unless otherwise authorized. Bending may be accomplished in the field or at the mill. Bars shall not be bent after embedment in concrete. Safety caps shall be placed on all exposed ends of vertical concrete reinforcement bars that pose a danger to life safety. Wire tie ends shall face away from the forms.

3.1.1 Placement

Reinforcement shall be free from loose rust and scale, dirt, oil, or other deleterious coating that could reduce bond with the concrete. Reinforcement shall be placed in accordance with ACI 318/318R at locations shown plus or minus one bar diameter. Reinforcement shall not be continuous through expansion joints and shall be as indicated through construction or contraction joints. Concrete coverage shall be as indicated or as required by ACI 318/318R. If bars are moved more than one bar diameter to avoid interference with other reinforcement, conduits or embedded items, the resulting arrangement of bars, including additional bars required to meet structural requirements, shall be approved before concrete is placed.

3.1.2 Splicing

Splices of reinforcement shall conform to ACI 318/318R and shall be made only as required or indicated. Splicing shall be by lapping or by mechanical or welded butt connection; except that lap splices shall not be used for bars larger than No. 11 unless otherwise indicated. Welding shall conform to AWS D1.4. Welded butt splices shall be full penetration butt welds. Lapped bars shall be placed in contact and securely tied or spaced transversely apart to permit the embedment of the entire surface of each bar in concrete. Lapped bars shall not be spaced farther apart than one-fifth the required length of lap or 6 inches. Mechanical butt splices shall be in accordance with the recommendation of the manufacturer of the mechanical splicing device. Butt splices shall develop 125 percent of the specified minimum yield tensile strength of the spliced bars or of the smaller bar in transition splices. Bars shall be flame dried before butt splicing. Adequate jigs and clamps or other devices shall be provided to support, align, and hold the longitudinal centerline of the bars to be butt spliced in a straight line.

3.2 WELDED-WIRE FABRIC PLACEMENT

Welded-wire fabric shall be placed in slabs as indicated. Fabric placed in slabs on grade shall be continuous between expansion, construction, and contraction joints. Fabric placement at joints shall be as indicated.

Lap splices shall be made in such a way that the overlapped area equals the distance between the outermost crosswires plus 2 inches. Laps shall be staggered to avoid continuous laps in either direction. Fabric shall be wired or clipped together at laps at intervals not to exceed 4 feet. Fabric shall be positioned by the use of supports.

3.3 DOWEL INSTALLATION

Dowels shall be installed in slabs on grade at locations indicated and at right angles to joint being doweled. Dowels shall be accurately positioned and aligned parallel to the finished concrete surface before concrete placement. Dowels shall be rigidly supported during concrete placement. One end of dowels shall be coated with a bond breaker.

3.4 SYNTHETIC FIBER REINFORCED CONCRETE

Fiber reinforcement shall be added to the concrete mix in accordance with the applicable sections of ASTM C 1116 and the recommendations of the manufacturer, and in an amount of 0.1 percent by volume.

3.5 SPECIAL INSPECTION AND TESTING FOR SEISMIC-RESISTING SYSTEMS

Special inspections and testing for seismic-resisting systems and components shall be done in accordance with Section 01452 SPECIAL INSPECTION FOR SEISMIC-RESISTING SYSTEMS.

-- End of Section --

SECTION 03301

CAST-IN-PLACE STRUCTURAL CONCRETE FOR CIVIL WORKS
03/94

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ACI INTERNATIONAL (ACI)

ACI 117/117R	(1990; Errata) Standard Tolerances for Concrete Construction and Materials
ACI 211.1	(1991) Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete
ACI 214	(1977; R 1989) Evaluation of Strength Test Results of Concrete
ACI 305R	(1991) Hot Weather Concreting
ACI 318/318R	(1992; Rev 1992; Errata) Building Code Requirements for Reinforced Concrete

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 31	(1991) Making and Curing Concrete Test Specimens in the Field
ASTM C 33	(1993) Concrete Aggregates
ASTM C 39	(1994) Compressive Strength of Cylindrical Concrete Specimens
ASTM C 42	(1994) Obtaining and Testing Drilled Cores and Sawed Beam of Concrete
ASTM C 94	(1994) Ready-Mixed Concrete
ASTM C 127	(1988; R 1993) Specific Gravity and Absorption of Coarse Aggregate
ASTM C 128	(1993) Specific Gravity and Absorption of Fine Aggregate
ASTM C 136	(1995a) Sieve Analysis of Fine and Coarse Aggregates
ASTM C 143	(1990a) Slump of Hydraulic Cement Concrete
ASTM C 150	(1995) Portland Cement
ASTM C 171	(1992) Sheet Materials for Curing Concrete
ASTM C 172	(1990) Sampling Freshly Mixed Concrete
ASTM C 192	(1990a) Making and Curing Concrete Test Specimens in the Laboratory
ASTM C 231	(1991b) Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C 260	(1994) Air-Entraining Admixtures for Concrete
ASTM C 309	(1994) Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C 494	(1992) Chemical Admixtures for Concrete
ASTM C 566	(1989) Total Moisture Content of Aggregate by Drying
ASTM C 597	(1983; R 1991) Pulse Velocity Through Concrete
ASTM C 618	(1994a) Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete
ASTM C 803	(1990) Penetration Resistance of Hardened Concrete
ASTM C 805	(1994) Rebound Number of Hardened Concrete
ASTM C 881	(1990) Epoxy-Resin-Base Bonding Systems for Concrete
ASTM C 1059	(1991) Latex Agents for Bonding Fresh to Hardened Concrete
ASTM C 1064	(1986; R 1993) Temperature of Freshly Mixed Portland Cement Concrete
ASTM C 1077	(1995a) Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation
ASTM C 1107	(1991a) Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
ASTM D 75	(1987; R 1992) Sampling Aggregates

CORPS OF ENGINEERS (COE)

COE CRD-C 94	(1995) Specifications for Surface Retarders
COE CRD-C 100	(1975) Method of Sampling Concrete Aggregate and Aggregate Sources, and Selection of Material for Testing
COE CRD-C 104	(1980) Method of Calculation of the Fineness Modulus of Aggregate
COE CRD-C 318	(1972) Cloth, Burlap, Jute (or Kenaf)
COE CRD-C 400	(1963) Requirements for Water for Use in Mixing or Curing Concrete
COE CRD-C 521	(1981) Standard Test Method for Frequency and Amplitude of Vibrators for Concrete

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)

NIST HB 44	(1994) NIST Handbook 44: Specifications, Tolerances, and other Technical Requirements for Weighing and Measuring Devices

NATIONAL READY-MIXED CONCRETE ASSOCIATION (NRMCA)

NRMCA CPMB 100	(1990) Concrete Plant Standards

1.2 UNIT PRICES

1.2.1 Water Control Structure

1.2.1.1 Payment

Payment will be made for costs associated with operations necessary for construction of the structure at Station 70+77.

1.2.1.2 Unit of Measure

Unit of measure: lump sum.

1.2.2 Concrete for Pipe Bedding

1.2.2.1 Payment

Payment will be made for costs associated with completing the concrete work for concrete placed for bedding of the outlet pipe at Station 70+77. However, these costs will not include the cost of embedded parts that are specified to be paid for separately. No payment will be made for concrete, as such, that is placed in structures of which payment is made as a lump sum.

1.2.2.2 Measurement

Concrete will be measurement for payment based upon the actual volume of concrete within the pay lines of the structures as indicated on the drawings. Measurement of concrete placed against the sides of any excavation without the use of intervening forms shall be made only within the pay lines of the structure. No deductions shall be made for rounded or beveled edges, space occupied by metal work, electrical conduits or reinforcing steel, or for voids or embedded items that are either less than 5 cubic feet in volume or 1 square foot in cross section.

1.2.2.3 Unit of Measure

Unit of measure: cubic yards.

1.3 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES.

SD-01 Data

Concrete Mixture Proportioning; FIO.

Concrete mixture proportions shall be determined by the Contractor, in accordance with the requirements in paragraph CONCRETE MIXTURE PROPORTIONING, and submitted for review. The concrete mixture quantities of all ingredients per cubic yard and nominal maximum coarse aggregate size that will be used in the manufacture of each quality of concrete shall be stated. Proportions shall indicate the mass of cement, pozzolan and ground granulated blast-furnace (GGBF) slag when used, and water; the mass of aggregates in a saturated surface-dry condition; and the quantities of admixtures. The submission shall be accompanied by test reports from a laboratory complying with ASTM C 1077 which show that proportions thus selected will produce concrete of the qualities indicated. No substitution shall be made in the source or type of materials used in the work without additional tests to show that the quality of the new materials and concrete are satisfactory.

Batch Plant; FIO.

The Contractor shall submit batch plant data to the Contracting Officer for review for conformance with applicable specifications.

Concrete Mixers; FIO.

The Contractor shall submit concrete mixer data which includes the make, type, and capacity of concrete mixers proposed for mixing concrete in conformance with the paragraphs CAPACITY and CONCRETE MIXERS.

Conveying Equipment and Methods; FIO.

The conveying equipment and methods for transporting, handling, and depositing the concrete shall be submitted for review by the Contracting Officer for conformance with paragraphs CAPACITY and CONVEYING EQUIPMENT.

Placing Equipment and Methods; FIO.

All placing equipment and methods shall be submitted for review by the Contracting Officer for conformance with paragraph CAPACITY.

SD-08 Statements

Testing Technicians; FIO. Concrete Construction Inspector; FIO.

The Contractor shall submit statements that the concrete testing technicians and the concrete inspectors meet the requirements of paragraph TESTS AND INSPECTIONS.

Construction Joint Treatment; GA.

The method and equipment proposed for joint cleanup and waste disposal shall be submitted for review and approval for conformance with paragraph CONSTRUCTION JOINT TREATMENT.

Curing and Protection; GA.

The curing medium and methods to be used shall be submitted for review and approval for conformance with paragraph CURING AND PROTECTION.

Cold-Weather Placing; GA.

If concrete is to be placed under cold-weather conditions, the proposed materials, methods, and protection meeting the requirements of paragraph COLD-WEATHER PLACING shall be submitted for approval.

Hot-Weather Placing; GA.

If concrete is to be placed under hot-weather conditions, the proposed materials and methods, meeting the requirements of paragraph HOT-WEATHER PLACING and paragraph FINISHING, shall be submitted for review and approval.

SD-09 Reports

Aggregate Quality; GA.

Aggregate quality tests shall be submitted at least 30 days prior to start of concrete placement, in accordance with paragraph QUALITY OF AGGREGATES.

Uniformity of Concrete Mixing; FIO.

The results of the initial mixer uniformity tests as required in paragraph MIXER UNIFORMITY shall be submitted at least 5 days prior to the initiation of placing.

Tests and Inspections; FIO.

Test results and inspection reports shall be submitted daily and weekly as required in paragraph REPORTS.

SD-13 Certificates

Impervious-Sheet Curing Materials; FIO.

Impervious-Sheet Curing Materials shall be certified for compliance with all specification requirements.

Air-Entraining Admixture; FIO.

Air-Entraining Admixture shall be certified for compliance with all specification requirements.

Other Chemical Admixtures; FIO.

Other Chemical Admixtures shall be certified for compliance with all specification requirements.

Epoxy Resin; FIO. Latex Bonding Compound; FIO.

Epoxy Resin and Latex Bonding Compound shall be certified for compliance with all specification requirements.

Nonshrink Grout; FIO.

Descriptive literature of the Nonshrink Grout proposed for use shall be furnished together with a certificate from the manufacturer stating that it is suitable for the application or exposure for which it is being considered.

SD-14 Samples

Aggregates; GA. Cementitious Materials, Admixtures, and Curing Compound; GA.

Samples of materials for government testing and approval shall be submitted as required in paragraph PRECONSTRUCTION SAMPLING AND TESTING.

1.4 GOVERNMENT TESTING AND SAMPLING

The Government will sample and test aggregates and concrete to determine compliance with the specifications. The Contractor shall provide facilities and labor as may be necessary for procurement of representative test samples. Samples of aggregates will be obtained at the point of batching in accordance with ASTM D 75. Concrete will be sampled in accordance with ASTM C 172.

1.4.1 Preconstruction Sampling and Testing

1.4.1.1 Aggregates

The aggregate sources listed at the end of this section for aggregates have been tested and at the time testing was performed were capable of producing materials of a quality required for this project provided suitable processing is performed. The Contractor may furnish materials from a listed source or from a source not listed. Samples from any source of coarse aggregate and any source of fine aggregate selected by the Contractor, consisting of not less than 150 pounds of each size coarse aggregate and 75 pounds of fine aggregate taken under the supervision of the Contracting Officer in accordance with COE CRD-C 100 shall be delivered to the Contracting Officer within 15 days after notice to proceed. Sampling and shipment of samples shall be at the Contractor's expense. 14 days will be required to complete evaluation of the aggregates. Testing will be performed by and at the expense of the Government in accordance with the applicable COE CRD-C or ASTM test methods. The cost of testing one source for each size of aggregate will be borne by the Government. If the Contractor selects more than one source for each aggregate size or selects a substitute source for any size aggregate after the original source was tested, the cost of that additional testing will be borne by the Contractor. Tests to which aggregate may be subjected are listed in paragraph QUALITY. The material from the proposed source shall meet the quality requirements of this paragraph. The Government's test data and other information on aggregate quality of those sources listed at the end of this section are included in the Design Memorandum and are available for review in the district office. Testing of aggregates by the Government does not relieve the Contractor of the requirements outlined in paragraph TESTS AND INSPECTIONS.

1.4.1.2 Cementitious Materials, Admixtures, and Curing Compound

At least 60 days in advance of concrete placement, the Contractor shall notify the Contracting Officer of the sources for cementitious materials, admixtures, and curing compound, along with sampling location, brand name, type, and quantity to be used in the manufacture and/or curing of the concrete.

1.4.2 Construction Testing by the Government

1.4.2.1 Chemical Admixtures Storage

Chemical admixtures that have been in storage at the project site for longer than 6 months or that have been subjected to freezing shall be retested at the expense of the Contractor when directed by the Contracting Officer and shall be rejected if test results are not satisfactory. Chemical admixtures will be accepted based on compliance with the requirements of paragraph CHEMICAL ADMIXTURES.

1.4.2.2 Cement and Pozzolan

If cement or pozzolan is to be obtained from more than one source, the initial notification shall state the estimated amount to be obtained from each source and the proposed schedule of shipments.

1.4.2.3 Concrete Strength

Compressive strength test specimens will be made by the Government and cured in accordance with ASTM C 31 and tested in accordance with ASTM C 39. The strength of the concrete will be considered satisfactory so long as the average of all sets of three consecutive test results equals or exceeds the specified compressive strength f'c and no individual test result falls below the specified strength f'c by more than 500 psi. A "test" is defined as the average of two companion cylinders, or if only one cylinder is tested, the results of the single cylinder test. Additional analysis or testing, including nondestructive testing, taking cores and/or load tests may be required at the Contractor's expense when the strength of the concrete in the structure is considered potentially deficient.

a. Investigation of Low-Strength Test Results - When any strength test of standard-cured test cylinders falls below the specified strength requirement by more than 500 psi or if tests of field-cured cylinders indicate deficiencies in protection and curing, steps shall be taken to assure that the load-carrying capacity of the structure is not jeopardized. Nondestructive testing in accordance with ASTM C 597, ASTM C 803, or ASTM C 805 may be permitted by the Contracting Officer to estimate the relative strengths at various locations in the structure as an aid in evaluating concrete strength in place or for selecting areas to be cored. Such tests shall not be used as a basis for acceptance or rejection.

b. Testing of Cores - When the strength of concrete in place is considered potentially deficient, cores shall be obtained and tested in accordance with ASTM C 42. At least three representative cores shall be taken from each member or area of concrete in place that is considered potentially deficient. The location of cores will be determined by the Contracting Officer to least impair the performance of the structure. Concrete in the area represented by the core testing will be considered adequate if the average strength of the cores is equal to at least 85 percent of the specified strength requirement and if no single core is less than 75 percent of the specified strength requirement.

c. Load Tests - If the core tests are inconclusive or impractical to obtain or if structural analysis does not confirm the safety of the structure, load tests may be directed by the Contracting Officer in accordance with the requirements of ACI 318/318R. Concrete work evaluated by structural analysis or by results of a load test shall be corrected in a manner satisfactory to the Contacting Officer. All investigations, testing, load tests, and correction of deficiencies will be performed and approved by the Contracting Officer at the expense of the Contractor, except that if all concrete is in compliance with the plans and specifications, the cost of investigations, testing, and load tests will be at the expense of the Government.

1.5 DESIGN REQUIREMENTS

1.5.1 Concrete Strength

Specified compressive strength f'c shall be as follows:

COMPRESSIVE STRENGTH (PSI)	STRUCTURE OR PORTION OF STRUCTURE
4,000 @ 28 days	70+77
100 @ 28 days	Flowable Concrete Pipe Bedding

1.5.2 Maximum Water-Cement (W/C) Ratio

Maximum W/C shall be as follows:

WATER-CEMENT RATIO, BY MASS	STRUCTURE OR PORTION OF STRUCTURE
0.45	70+77

These W/C's may cause higher strengths than that required by paragraph CONCRETE STRENGTH.

1.6 CONSTRUCTION TOLERANCES

1.6.1 General

The definitions of the terms used in the following tables shall be as defined in ACI 117/117R. Level and grade tolerance measurements of slabs shall be made as soon as possible after finishing. When forms or shoring are used, the measurements shall be made prior to removal. Tolerances are not cumulative. The most restrictive tolerance controls. Tolerances shall not extend the structure beyond legal boundaries. Except as specified otherwise, plus tolerance increases the amount or dimension to which it applies, or raises a level alignment, and minus tolerance decreases the amount or dimension to which it applied, or lowers a level alignment. A tolerance without sign means plus or minus. Where only one signed tolerance is specified, there is no limit in the other direction.

TOLERANCES FOR FOUNDATIONS

(1) Lateral alignment

Eccentricity measured from the center of gravity of footing as cast to the center of gravity as specified; 0.02 times width of footing in direction of misplacement but not more than ..... 2 in.

Supporting masonry construction ..... 1/2 in.

(2) Level alignment

Top of footings supporting masonry ..... 1/2 in.

Top of other footings ..... +1/2 in.
..... -2 in.

(3) Cross-sectional dimensions

Horizontal dimension of formed members ..... +2 in.
..... -1/2 in.

Horizontal dimensions of unformed members cast against soil

2 ft or less ..... +3 in.
..... -1/2 in.

Greater than 2 ft but less than 6 ft ..... +6 in.
..... -1/2 in.

Over 6 ft ..... +12 in.
..... -1/2 in.

Vertical dimension (thickness) ..... -5 percent

(4) Relative alignment

Slope of footing side and top surfaces with respect to the specified plane ..... 1 in. per 10 ft

TOLERANCES FOR CAST-IN-PLACE REINFORCED CONCRETE FOR BUILDINGS

(1) Vertical alignment

For heights 100 ft or less

TOLERANCES FOR CAST-IN-PLACE REINFORCED CONCRETE FOR BUILDINGS

Lines, surfaces, and arrises ..... 1 in.

Outside corner of exposed corner columns and control joint grooves in concrete exposed to view ..... 1/2 in.

For heights greater than 100 ft

Lines, surfaces, and arrises, 1/1,000 times the height at any point but not more than ..... 6 in.

Outside corner of exposed corner columns and control joint grooves in concrete, 1/2,000 times the height at any point but not more than ..... 3 in.

(2) Lateral alignment

Members ..... 1 in.

In slabs, centerline location of openings 12 in. or smaller and edge location of larger openings ..... 1/2 in.

Sawcuts, joints, and weakened plane embedment in slabs ..... 3/4 in.

(3) Level alignment
Top of slabs

Elevation of slabs-on-grade ..... 3/4 in.

Elevation of top surfaces of formed slabs before removal of supporting shores ..... 3/4 in.

Elevation of formed surfaces before removal of shores ..... 3/4 in.

Lintels, sills, parapets, horizontal grooves, and other lines lines exposed to view ..... 1/2 in.

(4) Cross-sectional dimensions
Members, such as columns, beams, piers, walls (thickness only), and slabs (thickness only)

12-in. dimension or less ..... +3/8 in.
..... -1/4 in.

More than 12 in. but not over 3-ft dimension ..... +1/2 in.
..... -3/8 in.

Over 3-ft dimension ..... +1 in.
..... -3/4 in.

(5) Relative alignment

Stairs

Different in height between adjacent risers ..... 1/8 in.

Different in width between adjacent treads ..... 1/4 in.

Grooves

Specified width 2 in. or less ..... 1/8 in.

Specified width more than 2 in. but not more than 12 in ..... 1/4 in.

Sawcuts, joints, and weakened plane on slab

Lateral, gradual ..... 3/4 in. in 10 ft

Lateral, abrupt ..... 0 in.

(6) Openings through members

Cross-sectional size of opening ..... -1/4 in.
..... +1 in.

TOLERANCES FOR CAST-IN-PLACE REINFORCED CONCRETE FOR BUILDINGS

Location of centerline of opening ..... 1/2 in.

TOLERANCE FOR FINISHED FORMED CONCRETE SURFACES

(1) Vertical alignment

Formed surfaces slope with respect to the specified plane

Vertical alignment of outside corner of exposed corner columns and control joint grooves in concrete exposed to view ..... 1/4 in. in 10 ft

All other conditions ..... 3/8 in. in 10 ft

(2) Abrupt variation

The offset between concrete surfaces for the following classes of surface:
(For Class AHV, positive means raise of elevation in the direction of waterflow, negative means drop of elevation in the direction of waterflow)

*Class AHV, in the direction of waterflow ..... +0 in.
..... -1/8 in.
perpendicular to the direction of waterflow ..... 1/8 in.
Class A ..... 1/8 in.
Class B ..... 1/4 in.
Class C ..... 1/4 in.
Class D ..... 1 in.

*Includes any high-velocity (ò40 fps) waterflow on any surface.

(3) Gradual variation

Surface finish tolerances as measured by placing a freestanding (unleveled), 5-ft straightedge for plane surface or curved template for curved surface anywhere on the surface and allowing it to rest upon two high spots within 72 hr after concrete placement. The gap at any point between the straightedge or template and the surface shall not exceed:

*Class A (including Class AHV) ..... 1/8 in.
Class B ..... 1/4 in.
Class C ..... 1/2 in.
Class D ..... 1 in.

*Includes any high-velocity (ò40 fps) waterflow on any surface.

TOLERANCES FOR CAST-IN-PLACE, VERTICALLY SLIPFORMED BUILDING ELEMENTS

(1) Translation and rotation from a fixed point at the base of the structure:

For heights 100 ft or less ..... 2 in.

For heights greater than 100 ft, 1/600 times the height but not more than ..... 8 in.

(2) Lateral alignment

Between adjacent elements ..... 2 in.

(3) Cross-sectional dimensions

Wall thickness ..... +3/4 in.
..... -3/8 in.

(4) Relative alignment

TOLERANCES FOR CAST-IN-PLACE, VERTICALLY SLIPFORMED BUILDING ELEMENTS

Formed surface slope with respect to the specified plane ..... 3/4 in. in 10 ft

TOLERANCES FOR CANAL LINING

(1) Lateral alignment

Alignment of tangents ..... 2 in.
Alignment of curves ..... 4 in.
Width of section at any height ..... 0.0025W+1 in.

(2) Level alignment

Profile grade ..... 1 in.
Surface of invert ..... 1/4 in.
Surface of side slope ..... 1/2 in.
Height of lining ..... 0.005H+1 in.

(3) Cross-sectional dimensions

Thickness of lining cross section: 1031420f specified thickness provided average thickness is maintained as determined by daily batch volumes.

TOLERANCES FOR BRIDGES, EROSION-PROTECTION STRUCTURES, AND SMALL HYDRAULIC STRUCTURES

(1) Vertical alignment

Exposed surfaces ..... 3/4 in.
Concealed surfaces ..... 1-1/2 in.

(2) Lateral alignment

Centerline alignment ..... 1 in.

(3) Level alignment (The following tolerances are for bridges only. For all other floor or slab tolerances see the paragraphs on floor tolerances following these tables.)

Profile grade ..... 1 in.

Top of other concrete surfaces and horizontal grooves.

Exposed ..... 3/4 in.
Concealed ..... 1-1/2 in.

Mainline pavements in longitudinal direction, the gap below a 10-ft unleveled straightedge resting on high spots shall not exceed ..... 1/8 in.

Mainline pavements and slabs in transverse direction, the gap below a 10-ft unleveled straightedge resting on high spots shall not exceed..... 1/4 in.

Ramps, sidewalks, and intersections, in any direction, the gap below a 10-ft unleveled straightedge resting on high spots shall not exceed ..... 1/4 in.

(4) Cross-sectional dimensions

Bridge slab thickness ..... +1/4 in.
..... -1/8 in.

Members such as columns, beams, piers, walls, and others (slabs--thickness only) ..... +1/2 in.
..... -1/4 in.

Openings through concrete members ..... 1/2 in.

(5) Relative alignment

Location of openings

TOLERANCES FOR BRIDGES, EROSION-PROTECTION STRUCTURES,
AND SMALL HYDRAULIC STRUCTURES

through concrete members ..... 1/2 in.

Formed surface slope with
respect to the specified plane

Watertight joints ..... 1/8 in. in 10 ft
Other exposed surfaces ..... 1/2 in. in 10 ft
Concealed surfaces ..... 1 in. in 10 ft

Unformed exposed surfaces
slopes with respect to the
specified plane ..... 1/4 in. in 10 ft
..... 3/8 in. in 20 ft

TOLERANCES FOR TUNNEL LININGS, CONDUITS, AND FILLING
AND EMPTYING CULVERTS

(1) Lateral alignment

Centerline alignment

Water conveying tunnels,
conduits, and culverts ..... 1/2 in.

Others ..... 1 in.

Inside dimensions ..... 0.005 times inside dimension

(2) Level alignment

Profile grade

Water conveying tunnels,
conduits, and culverts ..... 1/2 in.

Others ..... 1 in.

Surface of invert ..... 1/4 in.

Surface of side slope ..... 1/2 in.

(3) Cross-sectional dimension

Thickness at any point

Tunnel and culvert lining ..... -0 in.

Conduits ..... +5 percent thickness but
not less than 1/2 in.
..... -2.5 percent thickness but
not less than 1/4 in.

1.6.2 Appearance

Permanently exposed surfaces shall be cleaned, if stained or otherwise discolored, by a method that does not harm the concrete and that is approved by the Contracting Officer.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Cementitious Materials

Cementitious materials shall be portland cement, portland-pozzolan cement, portland blast-furnace slag cement, portland cement in combination with pozzolan or GGBF slag or portland cement in combination with silica fume and shall conform to appropriate specifications listed below. Use of cementitious materials in architectural concrete shall be restricted to one color, one source, and one type.

2.1.1.1 Portland Cement

ASTM C 150, Type I or II, except that the maximum amount of C3A in Type I cement shall be 15 percent

2.1.1.2 High-Early-Strength Portland Cement

ASTM C 150, Type III, .

2.1.1.3 Pozzolan, Other than Silica Fume

Pozzolan shall conform to ASTM C 618, Class C, F, with the optional requirements for multiple factor, drying shrinkage, and uniformity of Table 2A. Table 1A requirement for maximum alkalies shall apply when used with aggregates listed at the end of this section to require low-alkali cement.

2.1.2 Aggregates

2.1.2.1 General

Concrete aggregates may be furnished from any source capable of meeting the quality requirements as stated in paragraph QUALITY. The sources listed at the end of this section were evaluated during the design phase of the project and were found at that time capable of meeting the quality requirements when suitably processed. No guarantee is given or implied that any of the listed sources are currently capable of producing aggregates that meet the required quality stated in paragraph QUALITY. A Design Memorandum containing the results of the government investigation and test results is available for review in the [_____] district office. Contact [_____] at [_____] to arrange for review of the memorandum. The test results and conclusions shall be considered valid only for the sample tested and shall not be taken as an indication of the quality of all material from a source nor for the amount of processing required. Fine and coarse aggregates shall conform to the grading requirements of ASTM C 33. The nominal maximum size shall be as listed in paragraph NOMINAL MAXIMUM-SIZE COARSE AGGREGATE. Where the use of highway department gradations are permitted, proposed gradations shall be submitted for approval.

2.1.2.2 Concrete Aggregate Sources

a. List of Sources - The concrete aggregates sources may be selected from sources listed at the end of this section.

b. Selection of Source - After the award of the contract, the Contractor shall designate in writing only one source or combination of sources from which he proposes to furnish aggregates. If the Contractor proposes to furnish aggregates from a source or from sources not listed at the end of this section, he may designate only a single source or single combination of sources for aggregates. Regardless of the source, selected samples for acceptance testing shall be provided as required by paragraph GOVERNMENT TESTING AND SAMPLING. If a source for coarse or fine aggregates so designated by the Contractor does not meet the quality requirements stated in paragraph QUALITY, the Contractor may not submit for approval other non-listed sources but shall furnish the coarse or fine aggregate, as the case may be, from sources listed at the end of this section at no additional cost to the Government.

2.1.3 Chemical Admixtures

Chemical admixtures to be used, when required or permitted, shall conform to the appropriate specification listed.

2.1.3.1 Air-Entraining Admixture

The air-entraining admixture shall conform to ASTM C 260 and shall consistently cause the concrete to have an air content in the specified ranges under field conditions.

2.1.3.2 Accelerating Admixture

Accelerators shall meet the requirements of ASTM C 494, Type C or E, except that calcium chloride or admixtures containing calcium chloride shall not be used.

2.1.3.3 Water-Reducing or Retarding Admixture

a. Water-Reducing or Retarding Admixtures: ASTM C 494, Type A, B, or D, except that the 6-month and 1-year compressive strength tests are waived.

b. High-Range Water Reducing Admixture: ASTM C 494, Type F or G except that the 6-month and 1-year strength requirements shall be waived. The admixture may be used only when approved by the Contracting Officer, such approval being contingent upon particular mixture control as described in the Contractor's Quality Control Plan.

2.1.4 Curing Materials

2.1.4.1 Impervious-Sheet Curing Materials

Impervious-sheet curing materials shall conform to ASTM C 171, type optional, except polyethylene film shall not be used.

2.1.4.2 Membrane-Forming Curing Compound

The membrane-forming curing compound shall conform to ASTM C 309, Type 1-D or 2, except a styrene acrylate or chlorinated rubber compound meeting Class B requirements shall be used for surfaces that are to be painted or are to receive bituminous roofing, or waterproofing, or floors that are to receive adhesive applications of resilient flooring. The curing compound selected shall be compatible with any subsequent paint, roofing, coating, or flooring specified. Nonpigmented compound shall contain a fugitive dye and shall have the reflective requirements in ASTM C 309 waived.

2.1.4.3 Burlap

Burlap used for curing shall conform to COE CRD-C 318.

2.1.5 Water

Water for mixing and curing shall be fresh, clean, potable, and free of injurious amounts of oil, acid, salt, or alkali, except that nonpotable water may be used if it meets the requirements of COE CRD-C 400.

2.1.6 Nonshrink Grout

Nonshrink grout shall conform to ASTM C 1107 and shall be a commercial formulation suitable for the application proposed.

2.1.7 Abrasive Aggregates

Fifty-five percent, minimum, aluminum oxide or silicon-dioxide abrasive ceramically bonded together to form a homogeneous material sufficiently porous to provide a good bond with portland paste; or factory-graded emery aggregate consisting of not less than 45 percent aluminum oxide and 25 percent

ferric oxide. The aggregate shall be well graded from particles retained on the 600-µm (No. 30) sieve to particles passing the 2.36-mm (No. 8) sieve.

2.1.8 Latex Bonding Compound

Latex bonding compound agents for bonding fresh to hardened concrete shall conform to ASTM C 1059.

2.1.9 Epoxy Resin

Epoxy resin for use in repairs shall conform to ASTM C 881, Type III, Grade I or II.

2.2 CONCRETE MIXTURE PROPORTIONING

2.2.1 Quality of Mixture

For each portion of the structure, mixture proportions shall be selected so that the strength and W/C requirements listed in paragraph DESIGN REQUIREMENTS are met.

2.2.2 Nominal Maximum-Size Coarse Aggregate

Nominal maximum-size coarse aggregate shall be 1-1/2 inch inches except 19.0 mm (3/4 inch) nominal maximum-size coarse aggregate shall be used when any of the following conditions exist: the narrowest dimension between sides of forms is less than 7-1/2 inches, the depth of the slab is less than 4 inches, or the minimum clear spacing between reinforcing is less than 2-1/4 inches.

2.2.3 Air Content

Air content as delivered to the forms and as determined by ASTM C 231shall be between 4 and 7 percent except that when the nominal maximum-size coarse aggregate is 3/4 inch, it shall be between 4-1/2 and 7-1/2 percent.

2.2.4 Slump

The slump shall be determined in accordance with ASTM C 143 and shall be within the range of 1 to 4 inch. Where placement by pump is approved, the slump shall not exceed 6 inches. Concrete to be placed for flowable concrete pipe bedding may contain a chemical admixture for use in producing flowing concrete in accordance with ASTM C 1017, and the slump of the concrete shall not exceed 8 inches.

2.2.5 Concrete Proportioning

Trial batches and testing requirements for various qualities of concrete specified shall be the responsibility of the Contractor. Samples of aggregates shall be obtained in accordance with the requirements of ASTM D 75. Samples of materials other than aggregate shall be representative of those proposed for the project and shall be accompanied by the manufacturer's test reports indicating compliance with applicable specified requirements. Trial mixtures having proportions, consistencies, and air content suitable for the work shall be made based on methodology described in ACI 211.1, using at least three different water-cement ratios, which will produce a range of strength encompassing those required for the work. The maximum water-cement ratios required in paragraph MAXIMUM WATER-CEMENT RATIO will be converted to a weight ratio of water to cement plus pozzolan by mass, silica fume, or GGBF slag by mass equivalency as described in ACI 211.1. In the case where GGBF slag is used, the weight of the slag shall be included in the equations for the term P, which is used to denote the mass of pozzolan. If pozzolan is used in the concrete mixture, the minimum pozzolan content shall be 15 percent of the total cementitious material. Trial mixtures shall be proportioned for maximum permitted slump and air content with due consideration to the approved conveying and placement method. The temperature of concrete in each trial batch shall be reported. For each water-cement ratio, at least three test cylinders for each test age shall be made and cured in accordance with ASTM C 192. They shall be tested at 7 days and at the design age specified in paragraph DESIGN REQUIREMENTS in accordance with ASTM C 39. From these test results, a curve will be plotted showing the relationship between water-cement ratio and strength.

2.2.6 Required Average Compressive Strength

In meeting the strength requirements specified in paragraph CONCRETE STRENGTH, the selected mixture proportion shall produce a required average compressive strength f'cr exceeding the specified strength f'c by the amount indicated below.

2.2.6.1 Average Compressive Strength from Test Records

Where a concrete production facility has test records, a standard deviation shall be established in accordance with the applicable provisions of ACI 214. Test records from which a standard deviation is calculated shall represent materials, quality control procedures, and conditions similar to those expected, shall represent concrete produced to meet a specified strength or strengths (f'c) within 1,000 psi of that specified for proposed work, and shall consist of at least 30 consecutive tests. A strength test shall be the average of the strengths of two cylinders made from the same sample of concrete and tested at 28 days or at another test age designated for determination of f'c.

Required average compressive strength f'cr used as the basis for selection of concrete proportions shall be the larger of the equations that follow using the standard deviation as determined above:

$$f'cr = f'c + 1.34S$$
$$f'cr = f'c + 2.33S - 500$$

Where S = standard deviation

Where a concrete production facility does not have test records meeting the requirements above but does have a record based on 15 to 29 consecutive tests, a standard deviation shall be established as the product of the calculated standard deviation and a modification factor from the following table:

NUMBER OF TESTS*	MODIFICATION FACTOR FOR STANDARD DEVIATION Use tabulation in paragraph DETERMINING REQUIRED AVERAGE STRENGTH
less than 15	
15	1.16
20	1.08
25	1.03
30 or more	1.00

*Interpolate for intermediate numbers of tests.

2.2.6.2 Average Compressive Strength without Previous Test Records

When a concrete production facility does not have sufficient field strength test records for calculation of the standard deviation, the required average strength fcr shall be determined as follows:

If the specified compressive strength f'c is less than 3,000 psi,

f'cr = f'c + 1,000

If the specified compressive strength f'c is 3,000 to 5,000 psi,

f'cr = f'c + 1,200

If the specified compressive strength f'c is over 5,000 psi,

f'cr = f'c + 1,400

PART 3 EXECUTION

3.1 EQUIPMENT

3.1.1 Capacity

The batching, mixing, conveying, and placing equipment shall have a capacity of at least 20 cubic yards per hour.

3.1.2 Batch Plant

Batch plant shall conform to the requirements of NRMCA CPMB 100and as specified; however, rating plates attached to batch plant equipment are not required.

3.1.2.1 Batching Equipment

The batching controls shall be partially automatic. The semiautomatic batching system shall be provided with interlocks such that the discharge device cannot be actuated until the indicated material is within the applicable tolerance. The batching system shall be equipped with an accurate recorder or recorders that meet the requirements of NRMCA CPMB 100. Separate bins or compartments shall be provided for each size group of aggregate and cement, pozzolan, and GGBF slag. Aggregates shall be weighed either in separate weigh batchers with individual scales or cumulatively in one weigh batcher on one scale. Aggregate shall not be weighed in the same batcher with cement, pozzolan, or GGBF slag. If both cement and pozzolan or GGBF slag are used, they may be batched cumulatively provided that the portland cement is batched first. If measured by mass, the mass of the water shall not be weighed cumulatively with another ingredient. Water batcher filling and discharging valves shall be so interlocked that the discharge valve cannot be opened before the filling valve is fully closed. An accurate mechanical device for measuring and dispensing each admixture shall be provided. Each dispenser shall be interlocked with the batching and discharging operation of the water so that each admixture is separately batched and discharged automatically in a manner to obtain uniform distribution throughout the batch in the specified mixing period. Admixtures shall not be combined prior to introduction in water. The plant shall be arranged so as to facilitate the inspection of all operations at all times. Suitable facilities shall be provided for obtaining representative samples of aggregates from each bin or compartment. All filling ports for cementitious materials bins or silos shall be clearly marked with a permanent sign stating the contents.

3.1.2.2 Scales

The equipment for batching by mass shall conform to the applicable requirements of NIST HB 44, except that the accuracy shall be plus or minus 0.2 percent of scale capacity. The Contractor shall provide standard test weights and any other auxiliary equipment required for checking the operating performance of each scale or other measuring devices. Tests shall be made at the frequency required in paragraph TESTS AND INSPECTIONS, and in the presence of a government inspector.

3.1.2.3 Batching Tolerances

a. Weighing Tolerances

MATERIAL	PERCENT OF REQUIRED MASS
Cementitious materials	0 to plus 2
Aggregate	plus or minus 2
Water	plus or minus 1
Chemical admixture	0 to plus 6

b. Volumetric Tolerances - For volumetric batching equipment, the following tolerances shall apply to the required volume of material being batched:

Water: ..... Plus or minus 1 percent.
Chemical admixtures: ..... Zero to plus 6 percent.

3.1.2.4 Moisture Control

The plant shall be capable of ready adjustment to compensate for the varying moisture content of the aggregates and to change the masses of the materials being batched.

3.1.3 Concrete Mixers

The concrete mixers shall not be charged in excess of the capacity recommended by the manufacturer. The mixers shall be operated at the drum or mixing blade speed designated by the manufacturer. The mixers shall be maintained in satisfactory operating condition, and the mixer drums shall be kept free of hardened concrete. Should any mixer at any time produce unsatisfactory results, its use shall be promptly discontinued until it is repaired.

3.1.3.1 Stationary Mixers

Concrete plant mixers shall be tilting, nontilting, horizontal-shaft, vertical-shaft, or pugmill and shall be provided with an acceptable device to lock the discharge mechanism until the required mixing time has elapsed. The mixing time and uniformity shall conform to all the requirements in ASTM C 94 applicable to central-mixed concrete.

3.1.3.2 Truck Mixers

Truck mixers, the mixing of concrete therein, and concrete uniformity shall conform to the requirements of ASTM C 94. A truck mixer may be used either for complete mixing (transit-mixed) or to finish the partial mixing done in a stationary mixer (shrink-mixed). Each truck shall be equipped with two counters from which it will be possible to determine the number of revolutions at mixing speed and the number of revolutions at agitating speed.

3.1.4 Conveying Equipment

The conveying equipment shall conform to the following requirements.

3.1.4.1 Buckets

The interior hopper slope shall be not less than 58 degrees from the horizontal, the minimum dimension of the clear gate opening shall be at least five times the nominal maximum-size aggregate, and the area of the gate opening shall not be less than 2 square feet. The maximum dimension of the gate opening shall not be greater than twice the minimum dimension. The bucket gates shall be essentially grout tight when closed and may be manually, pneumatically, or hydraulically operated except that buckets larger than 2 cubic yards shall not be manually operated. The design of the bucket shall provide means for positive regulation of the amount and rate of deposit of concrete in each dumping position.

3.1.4.2 Transfer Hoppers

Concrete may be charged into nonagitating hoppers for transfer to other conveying devices. Transfer hoppers shall be capable of receiving concrete directly from delivery vehicles and have conical-shaped discharge features. The transfer hopper shall be equipped with a hydraulically operated gate and with a means of external vibration to effect complete discharge. Concrete shall not be held in nonagitating transfer hoppers more than 30 minutes.

3.1.4.3 Trucks

Truck mixers operating at agitating speed or truck agitators used for transporting plant-mixed concrete shall conform to the requirements of ASTM C 94. Nonagitating equipment may be used for transporting plant-mixed concrete over a smooth road when the hauling time is less than 15 minutes. Bodies of nonagitating equipment shall be smooth, watertight, metal containers specifically designed to transport concrete, shaped with rounded corners to minimize segregation, and equipped with gates that will permit positive control of the discharge of the concrete.

3.1.4.4 Chutes

When concrete can be placed directly from a truck mixer, agitator, or nonagitating equipment, the chutes attached to this equipment by the manufacturer may be used. A discharge deflector shall be used when required by the Contracting Officer. Separate chutes and other similar equipment will not be permitted for conveying concrete.

3.1.4.5 Belt Conveyors

Belt conveyors shall be designed and operated to assure a uniform flow of concrete from mixer to final place of deposit without segregation of ingredients or loss of mortar and shall be provided with positive means for preventing segregation of the concrete at the transfer points and the point of placing. Belt conveyors shall be constructed such that the idler spacing shall not exceed 36 inches. The belt speed shall be a minimum of 300 feet per minute and a maximum of 750 feet per minute. If concrete is to be placed through installed horizontal or sloping reinforcing bars, the conveyor shall discharge concrete into a pipe or elephant trunk that is long enough to extend through the reinforcing bars.

3.1.4.6 Concrete Pumps

Concrete may be conveyed by positive displacement pump when approved. The pumping equipment shall be piston or squeeze pressure. The pipeline shall be rigid steel pipe or heavy-duty flexible hose. The inside diameter of the pipe shall be at least three times the nominal maximum-size coarse aggregate in the concrete mixture to be pumped but not less than 4 inches. Aluminum pipe shall not be used.

3.1.5 Vibrators

Vibrators of the proper size, frequency, and amplitude shall be used for the type of work being performed in conformance with the following requirements:

APPLICATION	HEAD DIAMETER INCHES	FREQUENCY VPM	AMPLITUDE INCHES
Thin walls, beams, etc.	1-1/4 to 2-1/2	9,000 to 13,500	0.02 to 0.04
General construction	2 to 3-1/2	8,000 to 12,000	0.025 to 0.05

The frequency and amplitude shall be determined in accordance with COE CRD-C 521.

3.2 PREPARATION FOR PLACING

3.2.1 Embedded Items

Before placement of concrete, care shall be taken to determine that all embedded items are firmly and securely fastened in place as indicated on the drawings, or required. Embedded items shall be free of oil and other foreign matter such as loose coatings or rust, paint, and scale. The embedding of wood in concrete will be permitted only when specifically authorized or directed. Voids in sleeves, inserts, and anchor slots shall be filled temporarily with readily removable materials to prevent the entry of concrete into voids. Welding, including tack welding, will not be permitted on embedded metals within 2 feet of the surface of the concrete.

3.2.2 Concrete on Earth Foundations

Earth surfaces upon which concrete is to be placed shall be clean, damp, and free from debris, frost, ice, and standing or running water. Prior to placement of concrete, the earth foundation shall have been satisfactorily compacted in accordance with Section 02331, LEVEE CONSTRUCTION.

3.2.3 Concrete on Rock Foundations

Rock surfaces upon which concrete is to be placed shall be clean, free from oil, standing or running water, ice, mud, drummy rock, coating, debris, and loose, semidetached, or unsound fragments. Joints in rock shall be cleaned to a satisfactory depth, as determined by the Contracting Officer, and to firm rock on the sides. Immediately before the concrete is placed, all rock surfaces shall be cleaned thoroughly by the use of air-water jets or sandblasting as described in paragraph CONSTRUCTION JOINT TREATMENT. All rock surfaces shall be kept continuously wet for at least 24 hours immediately prior to placing concrete thereon. All approximately horizontal surfaces shall be covered, immediately before the concrete is placed, with a layer of mortar proportioned similar to that in the concrete mixture. The mortar shall be covered with concrete before the time of initial setting of the mortar.

3.2.4 Construction Joint Treatment

Construction joint treatment shall conform to the following requirements.

3.2.4.1 Joint Preparation

Concrete surfaces to which additional concrete is to be bonded shall be prepared for receiving the next lift or adjacent concrete by cleaning with either air-water cutting, sandblasting, high-pressure water jet, or other approved method. Air-water cutting will not be permitted on formed surfaces or surfaces congested with reinforcing steel. Regardless of the method used, the resulting surfaces shall be free from all laitance and inferior concrete so that clean, well bonded coarse aggregate is exposed uniformly throughout the lift surface. The edges of the coarse aggregate shall not be undercut. The surface shall be washed clean again as the last operation prior to placing the next lift. There shall be no standing water on the surface upon which concrete is placed.

3.2.4.2 Air-Water Cutting

Air-water cutting of a construction joint shall be performed at the proper time and only on horizontal construction joints. The air pressure used in the jet shall be 90 to 110 psi, and the water pressure shall be just sufficient to bring the water into effective influence of the air pressure. When approved by the Contracting Officer, a retarder complying with the requirements of COE CRD-C 94 may be applied to the surface of the lift to prolong the period of time during which air-water cutting is effective. Prior to receiving approval, the Contractor shall furnish samples of the material to be used and shall demonstrate the method to be used in applications. After cutting, the surface shall be washed and rinsed as long as there is any trace of cloudiness of the wash water. Where necessary to remove accumulated laitance, coatings, stains, debris, and other foreign material, high-pressure water jet or sandblasting will be required as the last operation before placing the next lift.

3.2.4.3 High-Pressure Water Jet

A stream of water under a pressure of not less than 3,000 psi may be used for cleaning. Its use shall be delayed until the concrete is sufficiently hard so that only the surface skin or mortar is removed and there is no undercutting of coarse-aggregate particles. If the water jet is incapable of a satisfactory cleaning, the surface shall be cleaned by sandblasting.

3.2.4.4 Wet Sandblasting

This method may be used when the concrete has reached sufficient strength to prevent undercutting of the coarse aggregate particles. The surface of the concrete shall then be washed thoroughly to remove all loose materials.

3.2.4.5 Waste Disposal

The method used in disposing of waste water employed in cutting, washing, and rinsing of concrete surfaces shall be such that the waste water does not stain, discolor, or affect exposed surfaces of the structures, or damage the environment of the project area. The method of disposal shall be subject to approval.

3.3 PLACING

3.3.1 Placing Procedures

The surfaces of horizontal construction joints shall be kept continuously wet for the first 12 hours during the 24-hour period prior to placing concrete. Surfaces may be dampened immediately before placement if necessary. Concrete placement will not be permitted when, in the opinion of the Contracting Officer, weather conditions prevent proper placement and consolidation. Concrete shall be deposited as close as possible to its final position in the forms and, in so depositing, there shall be no vertical drop greater than 5 feet except where suitable equipment is provided to prevent segregation and where specifically authorized. Depositing of the concrete shall be so regulated that it may be effectively consolidated in horizontal layers 2.0 feet or less in thickness with a minimum of lateral movement. The amount deposited in each location shall be that which can be readily and thoroughly consolidated. Sufficient placing capacity shall be provided so that concrete placement can be kept plastic and free of cold joints while concrete is being placed. Concrete shall be placed by methods that will prevent segregation or loss of ingredients. Any concrete transferred from one conveying device to another shall be passed through a hopper that is conical in shape. The concrete shall not be dropped vertically more than 5 feet, except where a properly designed and sized elephant truck with rigid drop chute bottom section is provided to prevent segregation and where specifically authorized. In no case will concrete be discharged to free-fall through reinforcing bars.

3.3.2 Placement by Pump

When concrete is to be placed by pump, the nominal maximum-size coarse aggregate shall not be reduced to accommodate the pumps. The distance to be pumped shall not exceed limits recommended by the pump manufacturer. The concrete shall be supplied to the concrete pump continuously. When pumping is completed, concrete remaining in the pipeline shall be ejected without contamination of concrete in place. After each operation, equipment shall be thoroughly cleaned, and flushing water shall be wasted outside of the forms. Grout used to lubricate the pumping equipment at the beginning of the placement will not be incorporated into the placement.

3.3.3 Time Interval Between Mixing and Placing

Concrete shall be placed within 30 minutes after discharge into nonagitating equipment. When concrete is truck-mixed or when a truck mixer or agitator is used for transporting concrete mixed by a concrete plant mixer, the concrete shall be delivered to the site of the work, and discharge shall be completed within 1-1/2 hours after introduction of the cement to the aggregates. When the length of haul makes it impossible to deliver truck-mixed concrete within these time limits, batching of cement and a portion of the mixing water shall be delayed until the truck mixer is at or near the construction site.

3.3.4 Cold-Weather Placing

When cold-weather placing of concrete is likely to be subjected to freezing temperatures before the expiration of the curing period, it shall be placed in accordance with procedures previously submitted in accordance with paragraph SUBMITTALS. The ambient temperature of the space adjacent to the concrete placement and surfaces to receive concrete shall be above 32 degrees F. The placing temperature of the concrete having a minimum dimension less than 12 inches shall be between 55 and 75 degrees F when measured in accordance with ASTM C 1064. The placing temperature of the concrete having a minimum dimension greater than 12 inches shall be between 50 and 70 degrees F. Heating of the mixing water or aggregates will be required to regulate the concrete-placing temperatures. Materials entering the mixer shall be free from ice, snow, or frozen lumps. Salt, chemicals, or other materials shall not be mixed with the concrete to prevent freezing.

3.3.5 Hot-Weather Placing

Concrete shall be properly placed and finished with procedures previously submitted in accordance with paragraph SUBMITTALS. The concrete-placing temperature shall not exceed 95 degrees F when measured in accordance with ASTM C 1064. Cooling of the mixing water and aggregates, or both, may be required to obtain an adequate placing temperature. A retarder meeting the requirements of paragraph WATER-REDUCING OR RETARDING ADMIXTURES may be used to facilitate placing and finishing. Steel forms and reinforcement shall be cooled prior to concrete placement when steel temperatures are greater than 120 degrees F. Conveying and placing equipment shall be cooled if necessary to maintain proper concrete-placing temperature.

3.3.6 Consolidation

Immediately after placement, each layer of concrete, including flowing concrete, shall be consolidated by internal vibrating equipment. Vibrators shall not be used to transport concrete within the forms. Hand spading may be required, if necessary, with internal vibrating along formed surfaces permanently exposed to view. Form or surface vibrators shall not be used unless specifically approved. The vibrator shall be inserted vertically at uniform spacing over the entire area of placement. The distance between insertions shall be approximately 1-1/2 times the radius of action of the vibrator. The vibrator shall penetrate rapidly to the bottom of the layer and at least 6 inches into the preceding unhardened layer if such exists. It shall be held stationary until the concrete is consolidated and then withdrawn slowly.

3.4 FINISHING

The ambient temperature of spaces adjacent to surfaces being finished shall be not less than 40 degrees F. In hot weather when the rate of evaporation of surface moisture, as determined by use of Figure 2.1.5 of ACI 305R, may reasonably be expected to exceed 0.2 pounds per square foot per hour. Provisions for windbreaks, shading, fog spraying, or wet covering with a light-colored material shall be made in advance of placement, and such protective measures shall be taken as quickly as finishing operations will allow. All unformed surfaces that are not to be covered by additional concrete or backfill shall have a float finish. Additional finishing shall be as specified below and shall be true to the elevation shown in the drawings. Surfaces to receive additional concrete or backfill shall be brought to the elevation shown on the drawings and left true and regular. Exterior surfaces shall be sloped for drainage unless otherwise shown in the drawing or as directed. Joints shall be carefully made with a jointing or edging tool. The finished surfaces shall be protected from stains or abrasions. Grate tampers or jitterbugs shall not be used.

3.4.1 Unformed Surfaces

3.4.1.1 Float Finish

Surfaces shall be screeded and darbied or bullfloated to bring the surface to the required finish level with no coarse aggregate visible. No water, cement, or mortar shall be added to the surface during the finishing operation. The concrete, while still green but sufficiently hardened to bear a man's weight without deep imprint, shall be floated to a true and even plane. Floating may be performed by use of suitable hand floats or power-driven equipment. Hand floats shall be made of magnesium or aluminum.

3.4.1.2 Trowel Finish

Concrete surfaces shall be finished with a float finish, and after surface moisture has disappeared, the surface shall be troweled to a smooth, even, dense finish free from blemishes including trowel marks.

3.4.2 Formed Surfaces

Unless another finish is specified, surfaces shall be left with the texture imparted by the forms except that defective surfaces shall be repaired as described in paragraph FORMED SURFACE REPAIR.

Unless painting of surfaces is required, uniform color of the concrete shall be maintained by use of only one mixture without changes in materials or proportions for any structure or portion of structure that is exposed to view or on which a special finish is required. The form panels used to produce the finish shall be orderly in arrangement, with joints between panels planned in approved relation to openings, building corners, and other architectural features. Forms shall not be reused if there is any evidence of surface wear or defects that would impair the quality of the surface.

3.4.3 Formed Surface Repair

After removal of forms, all ridges, lips, and bulges on surfaces permanently exposed shall be removed. All repairs shall be completed within 48 hours after form removal.

3.4.3.1 Classes A, AHV, & B Finishes

Surfaces listed in Section 03101 FORMWORK FOR CONCRETE and as shown to have classes A, AHV, and B finishes shall have surface defects repaired as follows: defective areas, voids, and honeycombs smaller than 16 square inches in area and less than 1/2 inch deep and bug holes exceeding 1/2 inch in diameter shall be chipped and filled with dry-packed mortar. Holes left by removal of tie rods shall be reamed and filled with dry-packed mortar as specified in paragraph MATERIAL AND PROCEDURE FOR REPAIRS. Defective and unsound concrete areas larger than described shall be defined by 1/2 inch deep dovetailed saw cuts in a rectangular pattern with lines parallel to the formwork, the defective concrete removed by chipping, and the void repaired with replacement concrete. The prepared area shall be brush-coated with an epoxy resin meeting the requirements of paragraph EPOXY RESIN, a latex bonding agent meeting the requirements of paragraph LATEX BONDING COMPOUND, or a neat cement grout after dampening the area with water. The void shall be filled with replacement concrete in accordance with paragraph MATERIAL AND PROCEDURE FOR REPAIRS.

3.4.3.2 Class C Finish

Surfaces listed in Section 03101 FORMWORK FOR CONCRETE and as shown shall have defects repaired as follows: defective areas, voids, and honeycombs smaller than 24 square inchesand less than 2 inches deep; bug holes exceeding 1-1/2 inches in diameter shall be chipped and filled with dry-packed mortar; and holes left by removal of the tie rods shall be chipped and filled with dry-packed mortar. Defective and unsound concrete areas larger than 24 square inches and deeper than 1-1/2 inches shall be defined by 1/2 inch deep dovetailed saw cuts in a rectangular pattern, the defective concrete removed by chipping, and the void repaired with replacement concrete. The prepared area shall be brush-coated with an epoxy resin meeting the requirements of paragraph EPOXY RESIN, a latex bonding agent meeting the requirements of paragraph LATEX BONDING COMPOUND, or a neat cement grout after dampening the area with water. The void shall be filled with replacement concrete in accordance with paragraph MATERIAL AND PROCEDURE FOR REPAIRS.

3.4.3.3 Class D Finish

Surfaces listed in Section 03101 FORMWORK FOR CONCRETE and as shown to have class D finish shall have surface defects repaired as follows: defective areas, voids, and honeycombs greater than 48 square inches in area or more than 2 inches deep shall be defined by 1/2 inch deep dovetailed saw cuts in a rectangular pattern, the defective concrete removed by chipping and the void repaired with replacement concrete. The prepared area shall be brush-coated with an epoxy resin meeting the requirements of paragraph EPOXY RESIN, a latex bonding agent meeting the requirements of paragraph LATEX BONDING COMPOUND, or a neat cement grout after dampening the area with water. The void shall be filled with replacement concrete in accordance with paragraph MATERIAL AND PROCEDURE FOR REPAIRS.

3.4.3.4 Material and Procedure for Repairs

The cement used in the dry-packed mortar or replacement concrete shall be a blend of the cement used for production of project concrete and white portland cement properly proportioned so that the final color of the mortar or concrete will match adjacent concrete. Trial batches shall be used to determine the proportions required to match colors. Dry-packed mortar shall consist of one part cement to two and one-half parts fine aggregate. The fine aggregate shall be that used for production of project concrete. The mortar shall be remixed over a period of at least 30 minutes without addition of water until it obtains the stiffest consistency that will permit placing. Mortar shall be thoroughly compacted into the prepared void by tamping, rodding, ramming, etc. and struck off to match adjacent concrete. Replacement concrete shall be produced using project materials and shall be proportioned by the Contracting Officer. It shall be thoroughly compacted into the prepared void by internal vibration, tamping, rodding, ramming, etc. and shall be struck off and finished to match adjacent concrete. Forms shall be used to confine the concrete. If an expanding agent is used in the repair concrete, the repair shall be thoroughly confined on all sides including the top surface. Metal tools shall not be used to finish permanently exposed surfaces. The repaired areas shall be cured for 7 days. The temperature of the in situ concrete, adjacent air, and replacement mortar or concrete shall be above40 degrees F during placement, finishing, and curing. Other methods and materials for repair may be used only when approved in writing by the Contracting Officer. Repairs of the so called "plaster-type" will not be permitted.

3.5 CURING AND PROTECTION

3.5.1 Duration

The length of the curing period shall be determined by the type of cementitious material, as specified below. Concrete shall be cured by an approved method.

Type I portland cement _____ 7 days

Immediately after placement, concrete shall be protected from premature drying, extremes in temperatures, rapid temperature change, and mechanical damage. All materials and equipment needed for adequate curing and protection shall be available and at the placement site prior to the start of concrete placement. Concrete shall be protected from the damaging effects of rain for 12 hours and from flowing water for 14 days . No fire or excessive heat including welding shall be permitted near or in direct contact with concrete or concrete embedments at any time.

3.5.2 Moist Curing

Moist-cured concrete shall be maintained continuously, not periodically, wet for the entire curing period. If water or curing materials stain or discolor concrete surfaces that are to be permanently exposed, they shall be cleaned as required in paragraph APPEARANCE. Where wooden form sheathing is left in place during curing, the sheathing shall be kept wet at all times. Where steel forms are left in place during curing, the forms shall be carefully broken loose from the hardened concrete and curing water continuously applied into the void so as to continuously saturate the entire concrete surface. Horizontal surfaces may be moist cured by ponding, by covering with a minimum uniform thickness of 2 inches of continuously saturated sand, or by covering with saturated nonstaining burlap or cotton mats. Horizontal construction joints may be allowed to dry for 12 hours immediately prior to the placing of the following lift. Silica fume concrete, if used, shall be moist-cured. Curing of silica fume concrete shall start immediately after placement.

3.5.3 Membrane-Forming Curing Compound

Concrete may be cured with an approved membrane-forming curing compound in lieu of moist curing except that membrane curing will not be permitted on any surface to which a grout-cleaned finish is to be applied or other concrete is to be bonded, on any surface containing protruding steel reinforcement, on an abrasive aggregate finish, or any surface maintained at curing temperature by use of free steam. A styrene acrylate or chlorinated rubber compound may be used for surfaces that are to be painted or are to receive bituminous roofing or waterproofing, or for floors that are to receive adhesive applications of resilient flooring. The curing compound selected shall be compatible with any subsequent paint, roofing, waterproofing, or flooring specified.

3.5.3.1 Pigmented Curing Compound

A pigmented curing compound meeting the requirements of the above paragraph MEMBRANE-FORMING CURING COMPOUND may be used on surfaces that will not be exposed to view when the project is completed.

3.5.3.2 Nonpigmented Curing Compound

A nonpigmented curing compound containing a fugitive dye may be used on surfaces that will be exposed to view when the project is completed. Concrete cured with nonpigmented curing compound must be shaded from the sun for the first 3 days when the ambient temperature is 90 degrees F or higher.

3.5.3.3 Application

The curing compound shall be applied to formed surfaces immediately after the forms are removed and prior to any patching or other surface treatment except the cleaning of loose sand, mortar, and debris from the surface. The surfaces shall be thoroughly moistened with water, and the curing compound applied as soon as free water disappears. The curing compound shall be applied to unformed surfaces as soon as free water has disappeared and bleeding has stopped. The curing compound shall be applied in a two-coat continuous operation by approved motorized power-spraying equipment operating at a minimum pressure of 75 psi, at a uniform coverage of not more than 400 square feet per gallon for each coat, and the second coat shall be applied perpendicular to the first coat. Concrete surfaces that have been subjected to rainfall within 3 hours after curing compound has been applied shall be resprayed by the method and at the coverage specified. All concrete surfaces on which the curing compound has been applied shall be adequately protected for the duration of the entire curing period from pedestrian and vehicular traffic and from any other cause that will disrupt the continuity of the curing membrane.

3.5.4 Cold-Weather Curing and Protection

When the daily outdoor low temperature is less than 32 degrees F, the temperature of the concrete shall be maintained above 40 degrees F for the first 7 days after placing. In addition, during the period of protection removal, the air temperature adjacent to the concrete surfaces shall be controlled so that concrete near the surface will not be subjected to a temperature differential of more than 25 degrees F as determined by observation of ambient and concrete temperatures indicated by suitable temperatures measuring devices furnished by the Government as required and installed adjacent to the concrete surface and 2 inches inside the surface of the concrete. The installation of the thermometers shall be made by the Contractor at such locations as may be directed.

3.6 SETTING OF BASE PLATES AND BEARING PLATES

3.6.1 Setting of Plates

After being plumbed and properly positioned, column base plates, bearing plates for beams and similar structural members, and machinery and equipment base plates shall be provided with full bearing with nonshrink grout. The space between the top of concrete or masonry-bearing surface and the bottom of the plate shall be approximately 1/24 of the width of the plate, but not less than 1/2 inch for plates less than 12 inches wide. Concrete surfaces shall be rough, clean, and free of oil, grease, and laitance, and they shall be damp. Metal surfaces shall be clean and free of oil, grease, and rust.

3.6.2 Nonshrink Grout Application

Nonshrink grout shall conform to the requirements of paragraph NONSHRINK GROUT. Water content shall be

the minimum that will provide a flowable mixture and fill the space to be grouted without segregation, bleeding, or reduction of strength.

3.6.2.1 Mixing and Placing of Nonshrink Grout

Mixing and placing shall be in conformance with the material manufacturer's instructions and as specified. Ingredients shall be thoroughly dry-mixed before adding water. After adding water, the batch shall be mixed for 3 minutes. Batches shall be of size to allow continuous placement of freshly mixed grout. Grout not used within 30 minutes after mixing shall be discarded. The space between the top of the concrete or masonry-bearing surface and the plate shall be filled solid with the grout. Forms shall be of wood or other equally suitable material for retaining the grout and shall be removed after the grout has set. If grade "A" grout as specified in ASTM C 1107 is used, all surfaces shall be formed to provide restraint. The placed grout shall be worked to eliminate voids; however, overworking and breakdown of the initial set shall be avoided. Grout shall not be retempered or subjected to vibration from any source. Where clearances are unusually small, placement shall be under pressure with a grout pump. Temperature of the grout, and of surfaces receiving the grout, shall be maintained at 65 to 85 degrees F until after setting.

3.6.2.2 Treatment of Exposed Surfaces

After the grout has set, those types containing metallic aggregate shall have the exposed surfaces cut back 1 inch and immediately covered with a parge coat of mortar proportioned by mass of one part portland cement, two parts sand, and sufficient water to make the mixture placeable. The parge coat shall have a smooth, dense finish. The exposed surface of other types of nonshrink grout shall have a smooth, dense finish.

3.6.2.3 Curing

Grout and parge coats shall be cured in conformance with paragraph CURING AND PROTECTION.

3.7 TESTS AND INSPECTIONS

Tests and inspections shall conform to the following requirements.

3.7.1 General

The Contractor shall perform the inspections and tests described below, and, based upon the results of these inspections and tests, he shall take the action required and submit reports as required. When, in the opinion of the Contracting Officer, the concreting operation is out of control, concrete placement shall cease. The laboratory performing the tests shall be on site and shall conform with ASTM C 1077. The individuals who sample and test concrete or the constituents of concrete as required in this specification shall have demonstrated a knowledge and ability to perform the necessary test procedures equivalent to the ACI minimum guidelines for certification of Concrete Field Testing Technicians, Grade I. The individuals who perform the inspection of concrete construction shall have demonstrated a knowledge and ability equivalent to the ACI minimum guidelines for certification of Concrete Construction Inspector, Level II. The Government will inspect the laboratory, equipment, and test procedures prior to start of concreting operations and at least once per year thereafter for conformance with ASTM C 1077.

3.7.2 Testing and Inspection Requirements

3.7.2.1 Fine Aggregate

a. Grading - At least once during each shift when the concrete plant is operating, there shall be one sieve analysis and fineness modulus determination in accordance with ASTM C 136 and COE CRD-C 104 for the fine aggregate or for each size range of fine aggregate if it is batched in more than one size or classification. The location at which samples are taken may be selected by the Contractor as the most advantageous for control. However, the Contractor is responsible for delivering fine aggregate to the mixer within specification limits.

b. Corrective Action for Fine Aggregate Grading - When the amount passing on any sieve is outside the specification limits, the fine aggregate shall be immediately resampled and retested. If there is another failure on any sieve, the fact shall immediately be reported to the Contracting Officer.

c. Moisture Content Testing - When in the opinion of the Contracting Officer the electric moisture meter is not operating satisfactorily, there shall be at least four tests for moisture content in accordance with ASTM C 566 during each 8-hour period of mixing plant operation. The times for the tests shall be selected randomly within the 8-hour period. An additional test shall be made whenever the slump is shown to be out of control or excessive variation in workability is reported by the placing foreman. When the electric moisture meter is operating satisfactorily, at least two direct measurements of moisture content shall be made per week to check the calibration of the meter. The results of tests for moisture content shall be used to adjust the added water in the control of the batch plant.

d. Moisture Content Corrective Action - Whenever the moisture content of the fine aggregate changes by 0.5 percent or more, the scale settings for the fine-aggregate batcher and water batcher shall be adjusted (directly or by means of a moisture compensation device) if necessary to maintain the specified slump.

3.7.2.2 Coarse Aggregate

a. Grading - At least once during each shift in which the concrete plant is operating, there shall be a sieve analysis in accordance with ASTM C 136 for each size of coarse aggregate. The location at which samples are taken may be selected by the Contractor as the most advantageous for production control. However, the Contractor shall be responsible for delivering the aggregate to the mixer within specification limits. A test record of samples of aggregate taken at the same locations shall show the results of the current test as well as the average results of the five most recent tests including the current test. The Contractor may adopt limits for control which are coarser than the specification limits for samples taken at locations other than as delivered to the mixer to allow for degradation during handling.

b. Corrective Action for Grading - When the amount passing any sieve is outside the specification limits, the coarse aggregate shall be immediately resampled and retested. If the second sample fails on any sieve, that fact shall be reported to the Contracting Officer. Where two consecutive averages of five tests are outside specification limits, the operation shall be considered out of control and shall be reported to the Contracting Officer. Concreting shall be stopped and immediate steps shall be taken to correct the grading.

c. Coarse Aggregate Moisture Content - A test for moisture content of each size group of coarse aggregate shall be made at least twice per week. When two consecutive readings for smallest size coarse aggregate differ by more than 1.0 percent, frequency of testing shall be increased to that specified above for fine aggregate, until the difference falls below 1.0 percent.

d. Coarse Aggregate Moisture Corrective Action - Whenever the moisture content of any size of coarse aggregate changes by 0.5 percent or more, the scale setting for the coarse aggregate batcher and the water batcher shall be adjusted if necessary to maintain the specified slump.

3.7.2.3 Quality of Aggregates

a. Frequency of Quality Tests - Thirty days prior to the start of concrete placement the Contractor shall perform all tests for aggregate quality listed below. In addition, after the start of concrete placement, the Contractor shall perform tests for aggregate quality in accordance with the frequency schedule shown below. Samples tested after the start of concrete placement shall be taken immediately prior to entering the concrete mixer.

	FREQUENCY		
PROPERTY	FINE AGGREGATE	COARSE AGGREGATE	TEST
Specific Gravity	Every 3 months	Every 3 months	ASTM C 127 ASTM C 128
Absorption	Every 3 months	Every 3 months	ASTM C 127 ASTM C 128

b. Corrective Action for Aggregate Quality - If the result of a quality test fails to meet the requirements for quality immediately prior to start of concrete placement, production procedures or materials shall be changed and additional tests shall be performed until the material meets the quality requirements prior to proceeding with either mixture proportioning studies or starting concrete placement. After concrete placement commences, whenever the result of a test for quality fails the requirements, the test shall be rerun immediately. If the second test fails the quality requirement, the fact shall be reported to the Contracting Officer and immediate steps taken to rectify the situation.

3.7.2.4 Scales

a. Weighing Accuracy - The accuracy of the scales shall be checked by test weights prior to start of concrete operations and at least once every 3 months for conformance with the applicable requirements of paragraph BATCHING EQUIPMENT. Such tests shall also be made as directed whenever there are variations in properties of the fresh concrete that could result from batching errors.

b. Batching and Recording Accuracy - Once a week the accuracy of each batching and recording device shall be checked during a weighing operation by noting and recording the required weight, recorded weight, and the actual weight batched. The Contractor shall confirm that the calibration devices described in paragraph BATCH PLANT for checking the accuracy of dispensed admixtures are operating properly.

c. Scales Corrective Action - When either the weighing accuracy or batching accuracy does not comply with specification requirements, the plant shall not be operated until necessary adjustments or repairs have been made. Discrepancies in recording accuracies shall be corrected immediately.

3.7.2.5 Batch-Plant Control

The measurement of all constituent materials including cementitious materials, each size of aggregate, water, and admixtures shall be continuously controlled. The aggregate weights and amount of added water shall be adjusted as necessary to compensate for free moisture in the aggregates. The amount of air-entraining agent shall be adjusted to control air content within specified limits. A report shall be prepared indicating type and source of cement used, type and source of pozzolan or slag used, amount and source of admixtures used, aggregate source, the required aggregate and water weights per cubic yard, amount of water as free moisture in each size of aggregate, and the batch aggregate and water weights per cubic yard for each class of concrete batched during plant operation.

3.7.2.6 Concrete Mixture

a. Air Content Testing - Air content tests shall be made when test specimens are fabricated. In addition, at least two tests for air content shall be made on randomly selected batches of each separate concrete mixture produced during each 8-hour period of concrete production. Additional tests shall be made when excessive variation in workability is reported by the placing foreman or Government quality assurance representative. Tests shall be made in accordance with ASTM C 231. Test results shall be plotted on control charts which shall at all times be readily available to the Government. Copies of the current control charts shall be kept in the field by the Contractor's quality control representatives and results plotted as tests are made. When a single test result reaches either the upper or lower action limit a second test shall immediately be made. The results of the two tests shall be averaged and this average used as the air content of the batch to plot on both the control chart for air content and the control chart for range, and for determining the need for any remedial action. The result of each test, or average as noted in the previous sentence, shall be plotted on a separate chart for each mixture on which an "average line" is set at the midpoint of the specified air content range from paragraph AIR CONTENT. An upper warning limit and a lower warning limit line shall be set 1.0 percentage point above and below the average line. An upper action limit and a lower action limit line shall be set 1.5 percentage points above and below the average line, respectively. The range between each two consecutive tests shall be plotted on a

control chart for range where an upper warning limit is set at 2.0 percentage points and up upper action limit is set at 3.0 percentage points. Samples for air content may be taken at the mixer, however, the Contractor is responsible for delivering the concrete to the placement site at the stipulated air content. If the Contractor's materials or transportation methods cause air content loss between the mixer and the placement, correlation samples shall be taken at the placement site as required by the Contracting Officer and the air content at the mixer controlled as directed.

b. Air Content Corrective Action - Whenever points on the control chart for percent air reach either warning limit, an adjustment shall immediately be made in the amount of air-entraining admixture batched. As soon as is practical after each adjustment, another test shall be made to verify the result of the adjustment. Whenever a point on the control chart range reaches the warning limit, the admixture dispenser shall be recalibrated to ensure that it is operating accurately and with good reproducibility. Whenever a point on either control chart reaches an action limit line, the air content shall be considered out of control and the concreting operation shall immediately be halted until the air content is under control. Additional air content tests shall be made when concreting is restarted. All this shall be at no extra cost to the Government.

c. Slump Testing - In addition to slump tests which shall be made when test specimens are fabricated, at least four slump tests shall be made on randomly selected batches in accordance with ASTM C 143 for each separate concrete mixture produced during each 8-hour or less period of concrete production each day. Also, additional tests shall be made when excessive variation in workability is reported by the placing foreman or Government's quality assurance representative. Test results shall be plotted on control charts which shall at all times be readily available to the Government. Copies of the current control charts shall be kept in the field by the Contractor's quality control representatives and results plotted as tests are made. When a single slump test reaches or goes beyond either the upper or lower action limit, a second test shall immediately be made on the same batch of concrete. The results of the two tests shall be averaged and this average used as the slump of the batch to plot on both the control chart for percent air and the chart for range, and for determining the need for any remedial action. An upper warning limit shall be set at 1/2 inch below the maximum allowable slump on separate control charts for percent air used for each type of mixture as specified in paragraph SLUMP, and an upper action limit line and lower action limit line shall be set at the maximum and minimum allowable slumps, respectively, as specified in the same paragraph. The range between each consecutive slump test for each type of mixture shall be plotted on a single control chart for range on which an upper action limit is set at 2 inches. Samples for slump shall be taken at the mixer, however, the Contractor is responsible for delivering the concrete to the placement site at the stipulated slump. If the Contractor's materials or transportation methods cause slump loss between mixer and the placement, correlation samples shall be taken at the placement site as required by the Contracting Officer and the slump at the mixer controlled as directed.

d. Slump Corrective Action - Whenever points on the control chart for slump reach the upper warning limit, an adjustment shall be immediately made in the batch weights of water and fine aggregate. The adjustments are to be made so that the total water content does not exceed that amount allowed by the maximum W/C specified, based upon aggregates which are in a saturated surface-dry condition. When a single slump reaches the upper or lower action limit, no further concrete shall be delivered to the placing site until proper adjustments have been made. Immediately after each adjustment, another test shall be made to verify the correctness of the adjustment. Whenever two consecutive slump tests, made during a period when there was no adjustment of batch weights, produce a point on the control chart for range at or above the upper action limit, the concreting operation shall immediately be halted and the Contractor shall take appropriate steps to bring the slump under control. Also, additional slump tests shall be made as directed. All this shall be at no additional cost to the Government.

e. Temperature - The temperature of the concrete shall be measured when compressive strength specimens are fabricated. Measurement shall be in accordance with ASTM C 1064. The temperature shall be reported along with the compressive strength data.

f. Compressive-Strength Specimens - At least one set of test specimens shall be made each day on each different concrete mixture placed during the day. Additional sets of test cylinders shall be made, as directed by the Contracting Officer, when the mixture proportions are changed or when low strengths have been detected. A random sampling plan shall be developed by the Contractor and approved by the Contracting Officer prior to the start of construction. The plan shall assure that sampling is done in a completely random and unbiased manner. A set of test specimens for concrete with a 28-day specified strength per paragraph DESIGN REQUIREMENTS shall consist of four cylinders, two to be tested at 7 days and two at 28 days. A set of test specimens for concrete with a 90-day strength per specified paragraph DESIGN REQUIREMENTS shall consist of six cylinders, two tested at 7 days, two at 28 days, and two at 90 days. Test specimens shall be molded and cured in accordance with ASTM C 31 and tested in accordance with ASTM C 39. All compressive-strength tests shall be reported immediately to the Contracting Officer. Quality control charts shall be kept for individual strength tests, moving average for strength, and moving average for range for each mixture. The charts shall be similar to those found in ACI 214.

3.7.2.7 Inspection Before Placing

Foundation or construction joints, forms, and embedded items shall be inspected for quality by the Contractor in sufficient time prior to each concrete placement to certify to the Contracting Officer that they are ready to receive concrete. The results of each inspection shall be reported in writing.

3.7.2.8 Placing

a. Placing Inspection - The placing foreman shall supervise all placing operations, shall determine that the correct quality of concrete or grout is placed in each location as directed and shall be responsible for measuring and recording concrete temperatures and ambient temperature hourly during placing operations, weather conditions, time of placement, yardage placed, and method of placement.

b. Placing Corrective Action - The placing foreman shall not permit batching and placing to begin until he has verified that an adequate number of vibrators in working order and with competent operators are available. Placing shall not be continued if any pile of concrete is inadequately consolidated. If any batch of concrete fails to meet the temperature requirements, immediate steps shall be taken to improve temperature controls.

3.7.2.9 Vibrators

a. Vibrator Testing and Use - The frequency and amplitude of each vibrator shall be determined in accordance with COE CRD-C 521prior to initial use and at least once a month when concrete is being placed. Additional tests shall be made as directed when a vibrator does not appear to be adequately consolidating the concrete. The frequency shall be determined at the same time the vibrator is operating in concrete with the tachometer held against the upper end of the vibrator head while almost submerged and just before the vibrator is withdrawn from the concrete. The amplitude shall be determined with the head vibrating in air. Two measurements shall be taken, one near the tip and another near the upper end of the vibrator head and these results averaged. The make, model, type, and size of the vibrator and frequency and amplitude results shall be reported in writing.

b. Vibrator Corrective Action - Any vibrator not meeting the requirements of paragraph VIBRATORS shall be immediately removed from service and repaired or replaced.

3.7.2.10 Curing

a. Moist-Curing Inspections - At least once each shift, and once per day on nonwork days an inspection shall be made of all areas subject to moist curing. The surface moisture condition shall be noted and recorded.

b. Moist-Curing Corrective Action - When a daily inspection report lists an area of inadequate curing, immediate corrective action shall be taken, and the required curing period for such areas shall be extended by one (1) day.

c. Membrane-Curing Inspection - No curing compound shall be applied until the Contractor's authorized representative has verified that the compound is properly mixed and ready for spraying. At the end of each operation, he shall estimate the quantity of compound used by measurement of the container and the area of concrete surface covered and compute the rate of coverage in square feet per gallon. He shall note whether or not coverage is uniform.

d. Membrane-Curing Corrective Action - When the coverage rate of the curing compound is less than that specified or when the coverage is not uniform, the entire surface shall be sprayed again.

e. Sheet-Curing Inspection - At least once each shift and once per day on nonwork days, an inspection shall be made of all areas being cured using material sheets. The condition of the covering and the tightness of the laps and tapes shall be noted and recorded.

f. Sheet-Curing Corrective Action - When a daily inspection report lists any tears, holes, or laps or joints that are not completely closed, the tears and holes shall promptly be repaired or the sheets replaced, the joints closed, and the required curing period for those areas shall be extended by one (1) day.

3.7.2.11 Cold-Weather Protection and Sealed Insulation Curing

At least once each shift and once per day on nonwork days, an inspection shall be made of all areas subject to cold-weather protection. The protection system shall be inspected for holes, tears, unsealed joints, or other deficiencies that could result in damage to the concrete. Special attention shall be taken at edges, corners, and thin sections. Any deficiencies shall be noted, corrected, and reported.

3.7.2.12 Cold-Weather Protection Corrective Action

When a daily inspection report lists any holes, tears, unsealed joints, or other deficiencies, the deficiency shall be corrected immediately and the period of protection extended 1 day.

3.7.2.13 Mixer Uniformity

a. Stationary Mixers - Prior to the start of concrete placing and once every 6 months when concrete is being placed, or once for every 75,000 cubic yards of concrete placed, whichever results in the longest time interval, uniformity of concrete mixing shall be determined in accordance with ASTM C 94.

b. Truck Mixers - Prior to the start of concrete placing and at least once every 6 months when concrete is being placed, uniformity of concrete shall be determined in accordance with ASTM C 94. The truck mixers shall be selected randomly for testing. When satisfactory performance is found in one truck mixer, the performance of mixers of substantially the same design and condition of the blades may be regarded as satisfactory.

3.7.2.14 Mixer Uniformity Corrective Action

When a mixer fails to meet mixer uniformity requirements, either the mixer shall be removed from service on the work, the mixing time shall be increased, batching sequence changed, batch size reduced, or adjustments shall be made to the mixer until compliance is achieved.

3.7.3 Reports

All results of tests or inspections conducted shall be reported informally as they are completed and in writing daily. A weekly report shall be prepared for the updating of control charts covering the entire period from the start of the construction season through the current week. During periods of cold-weather protection, reports of pertinent temperatures shall be made daily. These requirements do not relieve the Contractor of the obligation to report certain failures immediately as required in preceding paragraphs. Such reports of failures and the action taken shall be confirmed in writing in the routine reports. The Contracting Officer has the right to examine all test and inspection records.

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LIST OF FINE AND COURSE AGGREGATE SOURCES

LAT/LONG	PIT LOCATION, ADDRESS AND TELEPHONE NUMBER	MAIN OFFICE, ADDRESS AND TELEPHONE NUMBER

FINE AGGREGATE

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COURSE AGGREGATE

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